REPORT

ON THE WORKING OF THE

DEPARTMENT OF AGRICULTURE

OF THE

CENTRAL PROVINCES

DURING THE YEAR ~~ENDING~~

1901-02 to 1909-10

00133956

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REPORT

ON THE

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DEPARTMENT OF AGRICULTURE,

CENTRAL PROVINCES,

FOR THE YEAR

1901-02.

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TABLE OF CONTENTS.

	Page.	Para.
I.—Prefatory.		
The organization of the Department of Agriculture ...	1	2
Special Establishment	2	3
Experimental Farms	2	4
Other branches of work	3	5
Changes in Officers	3	6
Touring	3	7
II.—Agricultural Education.		
The Nagpur Agricultural School	3 & 4	8
(A) The English Class	4	9
(B) The Normal Class	5	10
(C) The Malguzari Class	5 & 6	11
General	6	12
The general educational system of the Provinces as affecting Agriculture. .	6	13
Publication of agricultural information	6 & 7	14
III.—Agricultural Enquiry and Experiment.		
Review of the work of the Experimental Farm	7	14 (*a*)
Experiments with manures	7	15
Tillage	7	16
New crops	7 & 8	17
Ensilage	8	18
Plant diseases	8	19
Implements	8	20
The Sewage Farm	8	21
Other agricultural experiments and enquiries	8	22
Introduction of juar and cotton cultivation in Chhattisgarh ...	8 & 9	23
Introduction of cotton cultivation into the Feudatory States of Nandgaon and Khairagarh.	9	24
Improvement of the method of cultivation of kharif crops in the Hoshangabad District.	9 & 10	25
Ensilage experiments in Bilaspur and Hoshangabad ...	10	26
Fodder-cutting experiments	10	27
Introduction of an improved variety of maize and improved methods of cultivating this crop.	10	28
Paspalum dilatatum	10	29
Introduction of an improved variety of bajra	11	30
The 'Meagher' system of sewage disposal	11	31,
The use of saltpetre as a manure	11	32
The eradication of smut in juar	11	33
Smut in wheat	11	34
Rust in wheat	11 & 12	35
Insect pests—Grasshoppers	12	36

	Page.	Para.
White-ants as a pest of trees	12	37
Crop-cutting experiments	12 & 13	38
District Agricultural and Industrial Associations	13	39
IV.—Horticulture.		
General	13 & 14	40
V.—Veterinary.		
Office of Superintendent, Civil Veterinary Department, and Senior Veterinary Inspector.	14	41 & 42
Veterinary Dispensaries	14 & 15	43
Re-organization of staff	16	44
Ajmer students	16	45
Prizes for cattle-breeding	16	46
Rinderpest inoculation	16 & 17	47
Cattle-breeding Farm	17	48
Horse-breeding	17 & 18	49
Mule-breeding	18	50
Live-stock Return	18	51
Cattle disease	18	52
VI.—Co-operation with Enquiry under Imperial Control.		
The Meteorological Department	18 & 19	53
The Department of the Reporter on Economic Products:		
The Lac Industry	19	54
Indian edible gums	19	54
Tanning materials	19	54
Andropogon sorghum	19	54
Investigation into the forms of dioscorea—yams... ...	19	54
The Department of Agricultural Chemistry:		
Cotton-seed oil	20	55
Cattle foods	20	55
Lathyrus sativus	20	55
VII.—Museums.		
Museums	20	56
VIII.—General.		
Rusa-grass oil	20	57
Agave—the aloe plant and its fibre	21	58
Cultivation of tassar-silk worms	21	59

(The maximum limit for this report is 30 pages).

No. $\frac{732}{3}$.

FROM

F. G. SLY, ESQ., I. C. S.,

DIRECTOR OF AGRICULTURE,

Central Provinces,

TO

THE CHIEF SECRETARY TO THE HON'BLE THE CHIEF COMMISSIONER,

REVENUE DEPARTMENT,

Central Provinces.

Nagpur, the 20th February 1903.

SIR,

I have the honour to submit the Annual Report on the Department of Agriculture for the year ending the 31st March 1902. The orders directing the preparation of this report were received in your letter No. 6925, dated the 22nd December 1902. Hitherto the notes on the agricultural work of the Province have formed part of the Report on the Department of Land Records and Agriculture for the year ending the 30th September; and the first six months of the period now under report have, therefore, already been dealt with in that Report for the year ending the 30th September 1901. In order, however, to make the present report complete, I have recapitulated some of the matter contained in that report.

I.—PREFATORY.

The organization of the Department of Agriculture.

2. The work of the Provincial Department of Agriculture has hitherto been practically confined to the management of the Nagpur Experimental Farm, the Telenkheri Farm and Fuel and Fodder Reserves situated close to Nagpur, and the Nagpur Agricultural School. All experimental work has thus been concentrated at Nagpur, there being no organization for experimental work in other parts of the Province, whilst a much more important omission was the absence of any regular scheme for introducing to the actual cultivators of the soil, improved methods of agriculture tested upon the Experimental Farms. The Nagpur Experimental Farm, which was started in 1883, has done much excellent work, largely owing to the careful scheme of work laid down for it by its founder, Mr. J. B. Fuller, C. S. I., C. I. E., and its successful management by Mr. R. S. Joshi, who has been Superintendent since 1893. In spite of the absence of any organized department outside the Experimental Farm, successive Directors of Agriculture have endeavoured with the assistance of District Officers from time to time to carry out some practical work of agricultural improvements in districts, the results of which have been given from time to time in the Annual Reports on

the Department of Land Records and Agriculture. But during the past year it was recognized by the then Chief Commissioner, the Honourable Sir Andrew Fraser, K. C. S. I., that the time had come when the scope of the Department should be enlarged, if it was to have any real effect upon the agriculture of the Province. At his request a scheme for the re-organization of the Department was framed by me, which has since been approved, and it is appropriate that this re-organization should be noticed in the first separate report of the Department of Agriculture.

Special Establishment.

3. The special establishment provided under the re-organization scheme for the Department of Agriculture consists of one Assistant Director of Agriculture, two Agricultural Superintendents on salaries varying from Rs. 100 to Rs. 200 each, and six Agricultural Assistants on Rs. 50 each. The duty of the Assistant Director is the supervision of the working of the whole Department of Agriculture under the control of the Director. It is fortunate that the Province has already in Mr. R. S. Joshi an exceptionally efficient and resourceful agricultural expert with much experience of the local agricultural conditions and fully qualified to fill the post of Assistant Director. Proposals have been submitted to the Government of India for including the appointment of Assistant Director in the cadre of Extra-Assistant Commissioners, and pending sanction to that proposal, Mr. Joshi has been employed on special duty since the 11th February 1902. He has fully justified his selection by the excellent work done by him since his special appointment; he has given valuable expert advice in framing the enlarged programme of work, and is rapidly adapting himself to the requirements of the larger sphere of duties now entrusted to him. The remaining special establishment of two Agricultural Superintendents and six Agricultural Assistants is required for the management of agricultural work in the several districts of the Province, including the management of local Demonstration Farms. It is intended that one Superintendent shall work in the north and one in the south of the Province, but in the first year of working on a comparatively small scale, it has not been found necessary to fill these posts. They will ultimately be filled by men who have obtained a Diploma in Agriculture from a recognized College and who have received a further practical training in the capacity of Superintendent of one of the Experimental Farms. The six Agricultural Assistants have already been employed, the selection being made from the best students of past years in the Nagpur Agricultural School. During a tour towards the end of the rains, the work of all six was inspected by me in company with the Inspector-General of Agriculture, when it was found that five were doing well, whilst one was a failure and had to be removed. In order to provide suitable candidates in future, it has been arranged that every year two students, after successfully passing out of the school, shall receive a year's further practical training on the Nagpur Experimental Farm. By this means a constant supply of trained Overseers will be maintained. It was feared that the scheme might fail owing to the difficulty in obtaining trained Assistants to fill the posts, but a successful start has been made and the difficulty should be still less in future. It is fully recognized that this establishment cannot successfully carry on its work in the districts of the Province without the active co-operation and assistance of the Deputy Commissioner and his staff, but this has been freely given, many District Officers having shown considerable enthusiasm in encouraging this new work. I have endeavoured to secure that each Deputy Commissioner shall not only advise upon the programme of work for his district, but be closely associated in its performance.

Experimental Farms.

4. The second portion of the re-organization scheme consisted of an improvement of the Nagpur Farm (of which the Telenkheri Farm may be considered an adjunct) and the establishment of two new Experimental Farms in Chhattisgarh and in the Nerbudda Valley. The Nagpur Farm has largely benefited by the constant inspection and advice of the Inspector-General of Agriculture, who has fixed his headquarters at Nagpur; and its programme of experimental work has been considerably improved. The Local Administration has also sanctioned the extension and improvement of the irrigation works at a total cost of Rs. 10,000,

to which the Inspector-General of Agriculture has made a grant of Rs. 2,840. The Farm Establishment has also been strengthened and re-organized (*vide* your letter No. 5772, dated the 15th October 1902). But it is impossible for a single Experimental Farm at Nagpur to deal with all the very diversified systems of agriculture followed in the different parts of the Provinces. The Local Administration has consequently sanctioned the establishment of two additional Experimental Farms, one in the wheat country of the Nerbudda Valley and one in the rice country of Chhattisgarh. The Nagpur Farm will then be able to devote itself more thoroughly to the cotton and juar cultivation of the Nagpur country. The main object of the Nerbudda Valley Farm will be enquiring into the cultivation of wheat and other rabi staples grown in the northern districts, more particularly into such subjects as rust in wheat, insect pests, irrigation of black soil, manuring of wheat and the like. The Experimental Farm in Chhattisgarh will largely be concerned with investigations into rice cultivation, the several systems of sowing and transplanting, irrigation, varieties of rice and the like. The Inspector-General of Agriculture was good enough to accompany me on a special tour to visit the possible sites for these Farms, with the result that fairly good plots of land were selected at Raipur and at Hoshangabad. The irrigation facilities are now being tested, after which proposals for the acquisition of the land will be submitted.

Other branches of work.

5. The re-organization scheme also dealt with the Nagpur Agricultural School, the formation of District Agricultural Associations, and the issue of a Vernacular Agricultural Journal, but it will be more convenient for me to deal with these matters in their proper place later on. With the Department so re-organized, it should be possible to do much towards the improvement of agriculture. The cultivators will be able to see demonstrations carried out in their own villages by a trained staff and will be induced to imitate them. Progress must necessarily be slow, and sporadic efforts will be of little avail, but if demonstrations of carefully selected practical experiments are carried on continuously for some few years, there is every hope of some ultimate success.

Changes in officers.

6. The post of Director of Agriculture was held until the 10th April 1901, by Mr L. S. Carey, and from that date until the close of the year by myself. With effect from the 11th February 1902, Mr. R. S. Joshi, Superintendent of the Experimental Farm, was placed on special duty as Assistant Director, his post being taken by Mr. Bhaya Lal Dube, a passed student of the Agricultural Class and a graduate of the Poona College of Science.

Touring.

7. Mr. Joshi, as Superintendent of the Experimental Farm, visited Saoner and Hinganghat in November 1901, to inspect and report on the experimental cultivation of Egyptian cotton; and again in January 1902 he proceeded to Cawnpore to study the Australian methods of wheat breeding. As Assistant Director, Mr. Joshi was on tour in the Bilaspur and Raipur Districts in February and March, selecting sites for the Demonstration Farms which have since been established.

II.—AGRICULTURAL EDUCATION.

The Nagpur Agricultural School.

8. The Nagpur Agricultural School now consists of three sections:—

Section I.—The English classes, in which students pass through a two years' course of training in agriculture, preparatory to receiving appointments in the Subordinate Revenue Departments.

Section II.—The Normal classes, in which village schoolmasters undergo a course of training for six months in order to qualify them to teach in village schools the agricultural lessons embodied in the reading books.

Section III.—The malguzari class, in which the sons of land-owners and others who intend to make farming their profession in life, undergo a course of one year's training in practical farming.

The English Class.

9. The main object of these classes is to give a sound elementary education in agriculture to persons desiring Government employment in the Land Records, Settlement, Agricultural, Court of Wards and other departments. It has been a most excellent recruiting ground for suitable candidates for these departments, the standard of work in which has in consequence been much raised. The course of instruction, which is given in English, occupies two years, and includes the elements of Botany, Chemistry, Geology, Veterinary Science, Land Surveying, Drawing and Agriculture. The curriculum and text-books are not altogether suited to the local conditions of the Province, and, at my request, the Inspector-General of Agriculture has promised to revise them. Practical instruction is given in the Experimental Farm which adjoins the school, whilst the students are allotted plots of ground on which they grow their own crops, all the cultivation being done by their own hands. There is a Veterinary Dispensary next to the school, where the students are taught the treatment of simple cattle diseases. Four scholarships varying from Rs. 7 to Rs. 10 are given each year, whilst Government also awards a silver medal to the best student who passes out of the senior class. It is a pleasure to record that two endowment funds have been presented during the year. Rai Bahadur Chandra Kumar Chatterji has endowed a fund for the grant annually of a silver medal called "The Kalidas Choudry Medal" to the student of the senior class who does best in practical agriculture. The result of the first year's competition was very successful, and it is hoped that this endowment will lead to improvement in practical work. Mr. Ganga Prasad Khatri, Extra-Assistant Conservator of Forests, has endowed a fund for the grant annually of a silver medal called "The Smythies' Medal" to the best student. These endowments are gratifying evidence of the interest taken by enlightened native gentlemen in agricultural education. During the year, there were twelve students on the roll, of whom eight were in the senior and four in the junior class. The smallness of these numbers is a regrettable fact: but from enquiries which I have made, it would seem to be largely due to the raising of the educational standard for admission, a step of which I entirely approve, and which gives us a much better stamp of men for ultimate employment as Revenue Inspectors. No student is now admitted who has not passed at least the Matriculation or School Final Examination, special exemptions being permissible for the sons of land-owners and agriculturists. In so far as the decline in numbers is due to avoidable causes, I have endeavoured to remove them. There is no doubt that there is considerable ignorance as to the future prospects of passed students, and possibly in some quarters a feeling exists that the promotion of passed students is not so rapid as their claims merit. I have lost no opportunity of endeavouring to interest Deputy Commissioners in obtaining recruits for the school, and my thanks are due to several for their efforts in this direction: but there is still much room for further improvement in this respect. Copies of the prospectus have been distributed in order to secure wide publicity for the aims and scope of the institution. As regards complaints of slow promotion, a glance at the list of passed students will show that a very large proportion have received good promotion: they number amongst their ranks several Naib-Tahsildars and Assistant Superintendents: others have obtained good appointments on foreign service: and there is not a single passed student of good character and tried ability who has not been provided with a post as Revenue Inspector, and included in the list of candidates for the post of Assistant Superintendent of Land Records maintained in my office. One half of the appointments to Naib-Tahsildarships are, as far as possible, reserved annually for Revenue Inspectors of not less than three years' service, who, having passed at least the Matriculation or School Final Examination have obtained certificates at the school. I have also taken steps to remove cause for complaint as to the burdensome nature of the work. One of the main causes of this was the neglect of practical work for the cramming of students with a mass of scientific matter without practical illustration, which they could never hope to either assimilate or

apply. I have gone carefully into this matter with the teachers, and have revised the time-table so as to give much greater weight to practical work. An examination in practical work has also been introduced, and the endowment of the "Kalidas Choudhri Medal" for practical work should help to stimulate competition among the students. The revision of the curriculum and text-books will also be a step in the right direction. All the senior students were successful at the final examination, which was improved by the appointment of examiners having no connection with the school.

The Normal Class.

10. The object of this class is to train village schoolmasters in the proper methods of teaching the lessons on agriculture (taken from Fuller's Agricultural Primer) incorporated in the reading books in use in the Vernacular schools of the Provinces. The course of instruction is practical as well as theoretical. The students not only constantly visit the Farm, but they also cultivate small garden plots and are made to practise simple experiments with apparatus, the object of which is to enable them to illustrate in their own schools the lessons they have learnt in the class. Changes in the staff interfered considerably with the year's training in this class. The Director of Public Instruction has commented upon the fact that more weight has hitherto been attached to imparting a general smattering of scientific knowledge instead of limiting instruction to the lessons which the masters will themselves have to teach in the village school. I have endeavoured to remedy this defect by insisting that the instruction shall be limited to clear explanations of those subjects only which are to be taught in the village schools. During the year the two divisions of the normal class, instead of being trained separately at Takli and Nagpur, were brought together in the main school-building. Two sessions were held during the year, one of which opened in June 1901 and was attended by 44 schoolmasters, of whom 33 passed the prescribed test and obtained certificates; the second session opened in November, and was attended by 31 schoolmasters and 38 ex-students of the Normal Schools, total 68, of whom 63 passed and were awarded certificates. The examiners were selected from amongst gentlemen not connected with the instruction of the students; and in view of this improvement, the large proportion of successes is gratifying.

The Malguzari Class.

11. A very important departure was made during the year by the opening of a malguzari class, which was sanctioned in your letter No. 6131, dated the 21st November 1901, for providing the sons of agriculturists and others with a practical training in farming. The course lasts for ten months from the 15th May to the 15th March, thus covering two complete agricultural seasons, one kharif and one rabi. The object of the class is to give a sound training in practical farming rather than instruction in elementary agricultural science. The instruction given in the class-room is reduced to a minimum, the main education being given in the fields of the Experimental Farm, where the students take an active part in the actual operations of cultivation. The training thus corresponds more to the English system of farm pupils than to that of an agricultural school, the instruction being confined to subjects which can afterwards be put to use by any ordinary cultivator in his own fields. This new section of the school has made a fairly successful start, much assistance having been received from some District Officers in securing students. The opening of the class has also been welcomed by some District Councils, who have granted scholarships to students from their districts. Similar support has been received from some of the Feudatory States, whilst the Rajah of the Makrai Feudatory State has generously endowed a scholarship fund. Indeed, there is much evidence to show that there is a distinct movement amongst the more enlightened native gentlemen towards agricultural improvement. The old attitude of distrust and doubt towards any suggestions for improvement of local systems of cultivation has very largely disappeared, new proposals being now welcomed and given a trial—a result which I believe to be partly due to the chastening influence of the past famines and failures. The first class was joined by twenty students, of whom twelve were scholarship-holders. Some few of the students were too young to appreciate properly the training offered, and this is a fault which should be borne in mind in the selection of future candidates. Five have left either of their own accord or because they were not suitable students, leaving a class of

fifteen. At my inspections I have found the training proceeding on practical lines, and there seems every hope that the students are learning improved systems of agriculture, which they will be able to put in use in their future profession of farming.

General.

12. The school is generally in a flourishing state with over 100 students upon the rolls. The staff of teachers has been revised under the sanction given in your letter No. 8537, dated the 26th September 1902, the present scale being 1st Master Rs. 150, 2nd Master Rs. 125—5—150, 3rd Master Rs. 80—4—100 and 4th Master Rs. 50—4—70. The greatest improvemnet made during the year was the opening of a hostel adjoining the Experimental Farm. This hostel is, however, not large enough to house all the students, and its extension has been sanctioned. Instead of being scattered in boarding-houses in different parts, the students will then all be housed in one building, close to the class-rooms and Farm: and this should lead to a marked improvement in discipline. The present class-rooms are quite inadequate, but provision for class-rooms and laboratories for the whole school has been made in the Victoria Memorial Technical Institute, which is now being built on a site adjoining the Farm. The school-buildings will then be complete and excellent, all being concentrated close to the Farm. The Queen Victoria Memorial Fund has been devoted to the construction of a Technical Institute, a constitution for which has been framed. The object of the Institute is the agricultural and industrial development of the Central Provinces, and it will be managed by a governing body, of which the Director of Agriculture is President. When the Institute is completed it will be the centre of the work of this Department.

The general educational system of the Provinces as affecting agriculture.

13. Considerable attention has of late years been given to the education of agriculturists' children, forming as they do the bulk of the population. It was found that agriculture as a separate optional subject is apt to be neglected: and in order to avoid this, it has been made a part of the daily task in primary schools, by embodying the text-book on agriculture in the vernacular reading books. Attention has already been drawn above to the way in which the instruction of schoolmasters at the Normal School is confined to the lessons which they will afterwards be required to teach. Boys are instructed by patwaris in the village map and revenue papers, and attempts are made to secure that all boys shall accompany the patwari for a few days during khasra writing, to receive elementary instruction in the nature of crops and soils. The Honourable the Chief Commissioner found that these subjects were not being intelligently taught by some of the masters, and it has now been arranged with the Director of Public Instruction that instruction in the village map and patwari papers shall form a separate subject to be taught to schoolmasters in the normal class of the Agricultural School. This should lead to improvement in the teaching of this subject in the village schools. Most primary schools have small gardens as a means of providing occupation and supplying practical illustration of the agricultural instruction imparted: some of these gardens are well stocked with vegetables; prizes are offered for the best gardens in each district, and many masters take a keen interest in this branch of their work. At the same time, a half-time system has been adopted, with a special curriculum for agriculturists, who are only required to attend three hours a day, and are free to follow their ordinary pursuits for the rest of the day. Whole-timers, who undergo a more extensive course, usually expect to continue their studies beyond the upper primary stage: and their wants are well provided for in the two branches of the Agricultural School at Nagpur—the Vernacular class for those who intend to make agriculture their profession, and the English class, with its two years' course, for those who intend entering Government service.

Publication of agricultural information.

14. In addition to the usual crop forecasts, trade returns, agricultural statistics, and the season and crop report for 1901-02, the following bulletins were published by the Department:—

(1) Egyptian Cotton.
(2) The Aloe Plant and its Fibre.
(3) Termes Taprobanes—White Ants as a Pest of Trees.
(4) The use of Night Soil as Manure.

An important departure during the year was the publication from January onwards of a Monthly Hindi Agricultural Gazette, with a view to the spread of useful agricultural information in the districts of the Province. The subscription has been fixed at the small sum of Re. 1 a year. The venture has met with gratifying success; there are already no less than 1,025 subscribers, and the number is steadily increasing. It is also distributed free to certain officials and to selected practical cultivators: and the total distribution amounts to 1,525. The Gazette has thus become an important agency for the dissemination of agricultural information.

III.—Agricultural Enquiry and Experiment.

Review of the work of the Experimental Farm.

14. The report on the working of the Nagpur and Telinkheri Farms, for the year ending 31st March 1902, has already been submitted with my letter No. 174—7, dated the 16th January 1903. My present remarks are, therefore, confined to a short review of the year's work. The monsoon, though somewhat unevenly distributed, was favourable to kharif crops, and juar, cotton and tur, the principal crops grown on the Farm, all gave good outturns. For rabi or spring crops on the other hand, the season was disastrous. The soil on the Farm is generally black soil, of fair quality only, apt to dry quickly, and more suited for kharif cropping, which has always proved more successful than cold weather cropping. Owing to the lightness of the September rains and the absence of all rain during the next six months, rabi seed was sown in a dry bed, and lacked the usual cold-weather rain. Wheat and gram failed badly, and linseed alone gave a fair outturn.

Experiments with manures.

15. The principal experiments on the Farm are concerned with the trial of manures with and without rotation of crops, and with and without irrigation. Instead of manuring ground with a fixed weight of manure per acre, irrespective of actual manurial value, all manures will, in future, be analysed every year, and used in varying amounts so as to give a fixed quantity of nitrogen per acre. Owing to the poorness of the rabi yield, the year's experiments have not been very conclusive: but the results attained, such as they are, generally corroborate those of previous years. Cattle-dung has again proved itself the best manure both with and without irrigation. This is already well known to the cultivator, who, however, has much to learn as to the large possible increase of manurial value from proper conservation and storage. A system known as the box system, which has been on trial for some years, has given no better results than ordinary pitting, and is less healthy for the cattle. No definite conclusion has resulted from five years' experiments to decide whether a wheat field can be most profitably manured with cow-dung in June or in August. Experiments with bone manure in several forms and on various crops, uniformly point to the conclusion that this manure is of little use on the soil of the Farm: the outturn has in some cases even been smaller than on unmanured plots. Saltpetre on the other hand has again proved its great manurial value, particularly with irrigation: and experiments show that a top-dressing of 80 lbs. per acre is much more valuable than 240 lbs. drilled in with the seed. Owing to the dryness of the season, green manuring was not very successful: but experiments show that its effect is cumulative and profitable. The Meagher system of sewage disposal has been entirely successful, and efforts are being made to induce several Municipalities to take it up.

Tillage.

16. Experiments under tillage have been confined to testing the effect of deep ploughing on unirrigated wheat: they are not very conclusive, but the Swedish plough has given better results than the country plough.

New crops.

17. Several varieties of cotton have been tried. A perennial variety, called "Sea Island," received from the Saidapet Experimental Farm, has been successfully grown, though not without irrigation, but it has not yet yielded, and its merits therefore remain to be tested. The acclimatized American variety "Upland Georgian" still gives fair results as an ordinary kharif crop, but its yield is poorer than the local varieties. Egyptian cotton continues to be successfully grown as an irrigated rabi crop;

but so long as irrigation can be more profitably applied to other garden crops, there is little hope of inducing local cultivators to take it up. Experiments in the cross-breeding of cotton, with a view to improving the staple, have been commenced. Selected seed of the best varieties of maize (Jaunpur) and bajri (*pennisetum typhoideum*) (the awned variety) have been distributed in the hope that they will, in time, replace the poor local varieties. Some seed of *sorghum* (*amber* and *collier*), which has proved a good fodder crop on the Farm, has been distributed to selected cultivators. *Paspalum dilatatum* has entirely failed to justify its Australian reputation as drought-resistant. It cannot survive the hot weather without irrigation, is soon choked out by local varieties, and does not form a good permanent pasture.

Ensilage.

18. Important experiments made with ensilage show that the wastage in the method of open stacking from the rotting of the exposed material renders it unprofitable except in very large stacks and when fodder material is very cheap. The closed silo has, on the other hand, been entirely successful, and good ensilage has been made of maize and juar stalks and coarse grass. Prickly pear as a silage crop, however, proved unsuccessful.

Plant diseases.

19. Investigations into rust in wheat were continued, but as this year was free from rust no definite result was achieved. Several Australian rust-proof wheats were successfully grown, and it is found that by using acclimatized seed, the crop comes to maturity earlier than by using fresh Australian seed. If they can be trained to become early varieties, their rust-resistant qualities may be developed. Cross-breeding experiments have also been started. The pickling of seed in a solution of sulphate of copper has continued to be quite successful in the eradication of smut in juar.

Implements. Annexure A.

20. The most successful new implement tried during the year was an American Fodder Cutter and Shredder. It avoids all waste in the feeding of juar stalks; it has caught on quickly and several have already been sold. A new winnowing machine obtained from America has also given very satisfactory results. A Cooke's turn-wrest plough has been tried successfully; it is a strong implement which works well in heavy black soil, being particularly suitable for breaking up waste land; but it is too expensive for the ordinary cultivator. The Swedish plough has continued to be popular. In accordance with the standing orders, a list of agricultural implements which were tested during the year is appended to this report.

The Sewage Farm.

21. The Sewage Farm has been successfully managed. Its working now shows a substantial profit. The rate of Rs. 75 an acre realized for the use of the land with the sewage and irrigation shows what can be done by municipalities in this way, whilst the magnificent crops raised by the Kachi cultivators are an object lesson in careful cultivation.

Other agricultural experiments and enquiries.

22. The re-organization scheme of the Department of Agriculture did not take effect till the close of the year under report. I then drew up a programme of the work of agricultural enquiry and experiment to be conducted in the districts of the Central Provinces during the current year. I propose to deal with this programme as well as the work actually done during the year under report.

Introduction of juar and cotton cultivation in Chhattisgarh.

23. For some few years efforts have been made to introduce juar and cotton cultivation into some parts of Chhattisgarh, which seem suitable for these crops. Sufficient advance has been made to justify hopes that some ultimate success may be achieved, but the difficulty in the past has been to induce the cultivators to abandon slovenly methods of cultivation with broadcast seed in favour of approved methods with seed-drills and other suitable implements. To overcome this difficulty it was decided that the Department of Agriculture

should take up some temporary Demonstration Farms, where juar and cotton could be grown upon approved methods as an object-lesson to local cultivators. Five Demonstration Farms (four in Bilaspur and one in Raipur) have been started, an Agricultural Assistant having been placed in charge of the work in each district. A complete equipment of plough-bullocks and implements has been supplied. The duties of the Agricultural Assistants are to grow juar and cotton upon approved methods at the Demonstration Farms, to fully explain the system to the local cultivators, and to encourage them to follow similar methods in their own fields. The use of the land for the farms is given by the holders, who also supply all labour, except that provided by the farm party, required for the preparation of the land, &c., in return for which the crop will be made over to them. These farms were inspected by the Inspector-General of Agriculture and myself in September last. The large farm at Khumari near Raipur has been very successfully managed by the Agricultural Assistant in charge of it. The site is a good one, being well-drained land along the bank of a river. The local cultivators at first showed considerable opposition to their fields being used for these novel crops, but they gradually gained some faith in the success of the experiment. At the time of our inspection, we found flourishing crops of both cotton and juar, which the cultivators were looking after. They had locally prepared implements after the pattern of those sent from Nagpur and were using them in their fields. The light rainfall of the current year has undoubtedly been favourable to the experiment, but it gives much promise of success and should be continued. Three out of the four farms visited by us in the Bilaspur District did not show such good results. In all cases the Agricultural Assistant in charge had most successfully managed the cultivation upon right principles, but the crops were poor and stunted. This was due to the nature of the land, which was a heavy black soil water-logged during the rains. The conditions at the time of our visit seemed so unpromising as to necessitate the abandonment of the experiment. But since then, reports have been more promising. It is stated that the country was seen by us at its worst just after heavy falls of rain, whilst the reported yields of the crops show that they must have recovered remarkably well. I do not propose, therefore, to abandon the experiment, but to endeavour to select more suitable sites for the Demonstration Farms. A more suitable variety of juar, less liable to damage from heavy rain, will also be tried.

Introduction of cotton cultivation into the Feudatory States of Nandgaon and Khairagarh.

24. These Feudatory States and the Bengal-Nagpur Cotton Mills Company (Raj-Nandgaon) have, for the past two years, endeavoured to introduce and extend the cultivation of cotton by making large advances of cotton-seed to cultivators upon favourable terms. This system was found to have the same defect as that previously followed in Bilaspur, *viz.*, that cultivators did not follow approved methods of cultivation. The Department of Agriculture, therefore, arranged to work Demonstration Farms upon the same lines as those described above. Four farms were started—two in Nandgaon and two in Khairagarh. These farms were also inspected by the Inspector-General of Agriculture and myself in September last. The experiments in Khairagarh were found to be failures; the sites had not been well chosen, whilst the Agricultural Assistant in charge (who was then removed from the Department) had neglected to manage them properly, with the result that the crops were badly cultivated and overgrown with weeds. Though these particular experiments failed, the country seems suitable for cotton and better managed experiments in the future should succeed. The farms in Raj-Nandgaon were, on the other hand, a complete success, containing good crops of cotton carefully grown. These experiments may be profitably extended, for there is a lot of land both in Khairagarh and Nandgaon which seems quite suited for cotton. Much of the success of the experiments in the Chhattisgarh Division is due to the assistance and encouragement received from the Divisional Commissioner, Mr. L. S. Carey, I. C. S.

Improvement of the method of cultivation of kharif crops in the Hoshangabad District.

25. The cultivation of kharif crops has largely extended of late years in the Hoshangabad District, but the cultivators follow a most slovenly system, the land being badly prepared, five or even more varieties of crop being sown broadcast as a mixture in the same field, and weeding, if at all done, being done by hand.

Under such a system the outturns are necessarily small. In order to introduce the better methods of cultivation followed in the Nagpur country, five Demonstration Farms were started with a completely equipped farm party under the charge of an Agricultural Assistant. Four of these farms were inspected by us in October last, when we found that the cultivation had been carefully done on proper principles and that the people took considerable interest in the demonstrations. The results were much superior to the local method of cultivation, and if the present plan is continued for a few years there is considerable hope of achieving the object of the experiment.

Ensilage experiments.

26. Experiments at the Nagpur Farm have shown that good ensilage can be made out of maize stalks, which are at present a waste product. Demonstrations of the system of making ensilage were, therefore, given in two districts, Bilaspur and Hoshangabad. A crop of maize was grown, and after the removal of the heads of grain, the stalks were packed in silos. The ordinary pits (*banda*) used by cultivators in Hoshangabad for the storing of grain was utilized as silos, whilst in Bilaspur silos were made by enclosing portions of cowsheds with mud walls on all sides. After these had been filled with maize stalks, they were closed by a covering of earth which was weighted down by stones, bags of sand or any waste material. The result of these experiments will be known in March next when the silos are opened.

Fodder-cutting experiments.

27. It was found at the Nagpur Farm that the feeding of cattle on chopped instead of whole stalks of fodder plants, such as juar, results in a very large saving of fodder, cattle readily consuming the thick portions of the stalks which are refused if given whole. An excellent American machine—the Harder Ensilage Cutter and Shredder—has also been used for chopping the fodder. It has been arranged that Agricultural Assistants will tour in some districts with a fodder-cutting machine, with which they will give practical demonstrations of the process and its advantages. They will also take with them a roundabout bullock gear (although the fodder-cutter can be worked by manual labour), in order to show this labour-saving appliance.

Introduction of an improved variety of maize and improved methods of cultivating this crop.

28. Trials have been made for some years past on the Nagpur Experimental Farm of many varieties of maize, including varieties received from America and other parts of India. A variety received from the United Provinces, and known as "Jaunpur," has proved its superiority as a prolific bearer of good quality. Acclimatized seed has now been sent to all districts for trial in the district gardens. It has also been found by experiments, both at the Nagpur and Cawnpore Experimental Farms, that the yield of this crop can be increased up to the American standard by improved methods of cultivation. These improved methods have been fully described and the Garden Superintendents have been asked to follow them. The stock of seed raised will be distributed to cultivators. This improved variety has also been grown on the Demonstration Farms.

Paspalum dilatatum.

29. The results of the experimental cultivation of the Australian fodder grass (*paspalum dilatatum*) have been reported in Bulletin No. 7 of 1902. The seed was sown both in a low-lying black-soil plot of land on the Farm and in the Telinkheri fodder reserves, which consist of a low range of stony hills. The germination of the seed sown at the Nagpur Farm and at Telinkheri was not as successful as in the previous years. The quality of the fodder is reported to be far superior to the other grasses, being more juicy, succulent and palatable. The grass on the hill died along with the other local varieties, whilst that grown on the Farm was only kept alive by irrigation. It thus failed to show any drought-resisting qualities. The yield was short and it shows little sign of forming permanent pasture land, growing in thin tussocky clumps. It is also smothered and overgrown by local varieties, unless kept clean by weeding. A small quantity of seed was sent to the Deputy Commissioner, Chanda, who reports that some of the seed was sown in the

Government Garden and also in low land along the river bank, but not a single seed germinated. The Deputy Commissioner ascribes the failure to the lateness in sowing. The experiments have thus failed in the Central Provinces.

Introduction of an improved variety of bajra.

30. Trials of several varieties of *bajra* (*pennisetum typhoideum*) upon the Nagpur Experimental Farm have established the superiority of the awned variety received from Bombay—a hardy prolific variety with the great advantage that, owing to the spike being protected by awns birds do not attack it. Acclimatized seed has been sent to several districts for distribution to and trial by selected cultivators. It has been found on the Farm that this variety tends to degenerate into an awnless variety, which would seem to be the result of natural cross-fertilization with other varieties of bajra grown in adjacent fields. No other variety of bajra should, therefore, be grown near it, if it is desired to keep it pure.

The 'Meagher' system of sewage disposal.

31. The Meagher system of sewage disposal, which has been fully described in Central Provinces Bulletin No. 5 of 1901, seems well suited to the profitable disposal of the sewage of small towns. It has therefore been arranged to give demonstrations of the system in several municipalities. An Agricultural Assistant will be deputed to visit the centres, making a stay of a fortnight or so at each centre so as to introduce and supervise the practical working.

The use of saltpetre as a manure.

32. Experiments at the Nagpur Farm have shown that saltpetre is a valuable manure for rice and wheat, the most profitable application being one of 80 lbs. per acre given as a top-dressing. Agricultural Assistants have demonstrated in several districts the use of this manure, by applying it to selected plots of cultivators' fields, an adjoining plot of equal quality being left unmanured. These plots will be reaped under supervision and the resulting outturns reported. If cultivators see for themselves the effect of the manure in their own fields, it is hoped that they may use it.

The eradication of smut in juar.

33. Enormous losses occur to the juar crop from the disease known as "smut," which can be completely eradicated by the pickling of seed before sowing in a solution of sulphate of copper. Efforts to popularize this treatment have been made by sending out thousands of vernacular leaflets describing the method, but this has not been very successful in inducing cultivators to try it. Another plan has been tried during the past season. All Revenue Inspectors of the two most important juar-producing districts—Nagpur and Wardha—were summoned for a day to head-quarters, where they were taught the method. They were supplied with some sulphate of copper for the purpose of making free experiments over as large a number as possible of the villages of their circles, so that the results may be widespread. They collect the villagers together, explain the method and induce as many as possible to follow their example with sulphate of copper purchased in the bazars. The final results will be reported hereafter.

Smut in wheat.

34. Smut also occurs in wheat and the same remedy is effectual. In order to prepare the way for experiments on the lines laid down above, Agricultural Assistants have toured in the above districts with a supply of sulphate of copper, with which they have given demonstrations at the wheat-sowing time. But further enquiries made by me seem to show that the losses from smut in wheat are generally very small, so that it hardly seems worth while to push this experiment. The losses from smut in juar are, on the other hand, very great indeed, so that the experiment referred to in the preceding paragraph will be continued and extended to other districts.

Rust in wheat.

35. Experiments have been conducted for some years past at the Nagpur Experimental Farm into the rust-resisting qualities of different varieties of wheat. Many varieties of the Central Provinces have been grown with the view of testing their local reputation as a

proof against rust, and although no completely rust-proof variety has been procured, many show much greater power than others to resist this disease. It has been found that these rust-resistant varieties are almost invariably poor milling wheats and are less valuable in the market than other varieties. The experiments have, therefore, been carried further by the endeavour to breed by cross-fertilization a fresh variety of wheat which will combine the good milling properties of one parent with the quality of resistance to rust of the other parent. Out of the cross-bred varieties, one raised from *haura* and *mundia-pissi* has shown promise of success; the grain has been highly valued in the local market, and has as yet shown no signs of rust, although it was surrounded by other varieties which were affected by that disease. Samples of this hybridized wheat were, accordingly, sent out for trial. As the conditions of the year were unfavourable to rust, its rust-resistant qualities could not be tested, but the reports received show that in other respects it is a prolific wheat of good milling quality. The experiments are being repeated in the coming season with the seed locally grown.

The statement has been advanced in Australia that the ravages of rust in wheat may be mitigated, if not prevented, by the use of two-year old seed. Experiments were made last year to test the truth of this statement, but failed owing to the absence of all rust. But the reports received from most districts show that the germination of the old seed was bad and that the crop was poor. I do not, therefore, propose to repeat these trials.

Insect pests—grasshoppers.

36. Much damage is caused by the ravages of caterpillars, more particularly to the rice and juar crops. The Inspector-General of Agriculture was good enough to depute Mr. S. Stockman, Assistant Imperial Bacteriologist, for the investigation of the local grasshopper pest. Mr. Stockman soon found that it was impossible to combat these pests by bacteriological methods, and so turned his attention to other remedies. A practical method of destroying them in rice fields was found out by him, which consists in dragging the fields with rough nets made out of sacking weighted at the bottom by pieces of metal. I saw this method demonstrated by Mr. Stockman in July last in the Bilaspur District, when it was found to be successful. It was then carried out over a large area under excellent arrangements made by the Deputy Commissioner. Nets were prepared for the use of the cultivators, and they were trained in the method of dredging, an Extra Assistant Commissioner (Mr. Slaney) being placed in charge of the operations. The method was freely taken up by the cultivators and a large number of villages was successfully cleared of grasshoppers, the proportion that escaped the dredging being small. Similar operations were successfully carried out on a smaller scale in the Raipur District. If they are continued for a few years, there seems no room why a rice tract should not be practically cleared of grasshoppers. Mr. Stockman also made careful and patient investigations into the loss caused by grasshoppers to the juar crops in the Nimar District. His report has been submitted to the Inspector-General of the Civil Veterinery Department, and its publication is awaited with interest.

White-ants as a pest of trees.

37. Deputy Commissioners have made extended trials of the mixture known as Gondal Fluid to test its efficiency as an exterminator of white-ants on trees. Reports of these trials have been received and the results published in Bulletin No. 6 of 1902. The results are generally very satisfactory.

Crop-cutting experiments.

38. The number of crop-cutting experiments made during the year 1901-02 was 938, as against 894 in the previous year. Of these 681 were experiments in kharif crops, and 257 in rabi crops. Officers of the Settlement Department contributed 59 per cent. of the total number, most of them being made in the Raipur District. Twelve Deputy Commissioners made crop experiments, *viz.*, those of Saugor, Damoh, Jubbulpore, Mandla, Seoni, Hoshangabad, Chhindwara, Wardha, Nagpur, Raipur, Bilaspur and Sambalpur. Of the total number of experiments, 65, conducted by Deputy Commissioners, no less than 33 were contributed by the Deputy Commissioner, Raipur. Only 29 experiments were made by Assistant Commissioners, and

Deputy Commissioners would do well to bear in mind that crop experiments are very useful training for junior civilians. Two hundred and ninety-two experiments were made by Extra-Assistant Commissioners. A large number of experiments were also made by officers of rank below that of Extra-Assistant Commissioner, but have not been compiled in this office. A point again brought to notice by an examination of the figures compiled is the haphazard way in which crops are frequently selected for experiment. For example, of the 558 experiments in rice, no less than 86 per cent. were made in Raipur, while the important rice-growing districts of Chanda and Sambalpur, where the crop was almost normal, contribute only 6 and 24 respectively. No rice cuttings were made in Mandla, Balaghat or Bilaspur. The important juar-growing district of Nimar reports no experiments in juar. Only 7 experiments in cotton are reported, whilst some of these were confined to the first picking only. The available information of the full yield of cotton is very meagre and it is very desirable that officers should make a considerable number of complete experiments. Similarly the information with regard to the outturn of til is particularly incomplete. Only 9 experiments in that crop were made throughout the Province.

District Agricultural and Industrial Associations.

39. Another important departure is the formation in each district of an Agricultural and Industrial Association. The objects of the Association are the development and improvement of the agricultural and industrial resources of the district. The District Officer is the president, whilst the Tahsildars and Superintendents of Land Records are the other official members, because their duties bring them into close contact with the land-holders. The non-official members are chosen from the leading residents who take a real interest in agricultural and industrial improvements. Each member pledges himself to do his best for the improvement of agriculture and promises to carry out in his own village any practical experimental work entrusted to him. Meetings are held at which a practical scheme of work is framed and the work allotted to the several members, who will afterwards report the results. I have endeavoured to arrange that the Agricultural Assistant shall, when possible, attend these meetings and deliver an address on some suitable subject. The Association is also consulted about the programme of work of the Department of Agriculture, and is induced to watch and assist in any demonstration work in progress. This movement has been received with considerable interest in some districts, where an excellent start has been made. It affords an excellent opportunity for the Department of Agriculture to get into touch with the leading cultivators of each district and to obtain their assistance and advice in experimental work. Indeed, the main feature of the year's work has been the endeavour to extend the work of agricultural improvement to the cultivators of the Province, by training their sons in practical farming at the malguzari class of the Nagpur Agricultural School, by the publication of the Hindi Agricultural Gazette, by the organization of a scheme of district experimental work under a special establishment, and by the formation of District Agricultural Associations.

IV.—Horticulture.

40. A report on the Provincial, District and Court of Wards gardens for the year ending 31st March 1902 has been submitted with my letter No. 3911-25, dated the 26th August 1902, which has been reviewed by the Hon'ble the Chief Commissioner in Resolution No. 5637, dated the 7th October 1902. The Provincial Gardens are three in number, the Maharajbagh and Telinkheri at Nagpur and the Pachmarhi garden. These were maintained in fairly good order, improvements being effected by the enlargement of the tiger house, the erection of a potting shed and the laying down of new lawns. The experiments with new varieties of American sweet potatoes have been successful and a large number of cuttings have been distributed to district gardens and to cultivators. The otaheiti potato (*dioscorea sativa*) was also successfully cultivated and some tubers have been distributed. The financial results were fairly good, but there is room for improvement at the Maharajbagh and at Pachmarhi. There are fifteen gardens under Government management at district head-quarters, but they suffer from the fact that their supervision is entrusted to a local officer, who may or may not be an expert gardener or interested in gardening. The season was not very favourable, but this does not fully account for the unfavourable financial results in some

gardens. The propagation and distribution of fruit trees and plants is one of the main functions of these gardens, but this was much neglected in several gardens. It is hoped that the remarks of the Hon'ble the Chief Commissioner will lead to improvement in this matter. Another function which district gardens can usefully perform is the cultivation of new and improved varieties of garden crops for seed distribution in the districts. The Raipur garden, successfully managed by Mr. Johnson, has done some most useful work in this way.

V.—VETERINARY.

41. The office of Superintendent, Civil Veterinary Department, continued to remain vacant almost throughout the year, until the appointment of Mr. J. S. Jethiji, M. R. C. V. S., who joined the post on the 22nd February 1902. He was deputed under the Inspector-General, Civil Veterinary Department, to undergo training on the 4th June 1902, so that no regular report has been written by him. In the following paragraphs I give a short account of the year's work.

Office of Superintendent and Senior Veterinary Inspector.

42. Whilst the office of Superintendent of the Civil Veterinary Department was in abeyance, Mr. C. Pillay, Veterinary Inspector, Nagpur, acted as my Assistant in veterinary matters in the temporarily sanctioned post of Senior Veterinary Inspector, on a salary of Rs. 150 per mensem. His duties were prescribed in my letter No. 3103, dated the 12th August 1901. During his tenure of the appointment, Mr. Pillay inspected the Piparia-Pachmarhi and Warora-Chanda dâk lines, the Government stallions at Saugor, Damoh, and Narsinghpur, and the dispensaries at Bilaspur, Raipur, Hohangabad, Jubbulpore, Wardha and Saugor. He also attended the Singaji cattle fair in the Nimar District and the Chhappara fair in the Seoni district. His appointment was abolished when Mr. Jethiji was posted to the Province as Superintendent.

Veterinary Dispensaries.

43. No new dispensary was opened during the year, but arrangements were made for a dispensary which has since been opened at Seoni, and proposals were made and sanctioned for the opening of another in Damoh. The following table will show the amount of use to which the dispensaries have been put during the year:—

Districts.	Number of cases treated.				Average daily attendance.		Number of operations performed.		Number of villages inspected.	Number of cases treated.
	Horned cattle.	Horses.	Other animals.	Total.	1900-01.	1901-02.	Major.	Minor.		
Nagpur ...	618	589	565	1,772	14·56	14·66	23	80	78	172
Raipur ...	828	862	587	2,277	...	...	43	163	102	1,458
Jubbulpore ...	683	783	306	1,772	...	15·05	17	134	58	326
Hoshangabad ...	626	255	135	1,016	5·82	22·60	3	54	2	2
Wardha ...	513	183	128	824	8·2	...	4	27	73	210
Bilaspur ...	1,724	346	238	(a)2,308	23·38	17·14	3	15	44	...
Mandla ...	950	331	121	1,402	15·53	15·62	5	22	132	396
Saugor ...	895	568	245	1,708	12·72	10·62	6	88	11	67
Total ...	6,837	3,917	2,325	13,079	...	...	104	583	500	2,421

(a) Includes 1,338 cases treated on tour.

The total number of cases treated was 13,079, or only 631 more than during the previous year, an increase of about 5 per cent. The dispensaries at Nagpur, Bilaspur and Saugor show a decrease of 30 per cent., 13 per cent. and 14 per cent.,

respectively. The decrease in Nagpur is said to be due to the discontinuance of the practice of sending a Veterinary Assistant to the city. No reason is assigned in Bilaspur, while in Saugor the dispensary had to be closed for about six weeks during the absence of the Veterinary Assistant at the Garhakota fair. The system of fees is also in some cases reported to have prevented persons from bringing their cattle for treatment, without materially adding to the income of the dispensary. I am of opinion that veterinary treatment in these Provinces is yet too much in its infancy to permit of the levy of even nominal fees, and until it has become thoroughly popularised and placed on a firm footing, I think it is better that a few persons who can afford to pay for treatment should escape payment than that even the most trifling deterrent should be offered to the inclinations of the general public. After making all due allowances however, and taking into consideration the increase in popularity of some dispensaries, the fact remains that veterinary treatment has not in these Provinces made the progress which could be desired. Something of this no doubt is to be ascribed to the apathy of the Veterinary subordinates, the absence of supervision by a Superintendent, and the lack of interest in the matter displayed by some District Councils: but the apathy and ignorance of the cultivating classes can never, in my opinion, be overcome until the local Veterinary staff consists of more than one assistant, and a thorough and systematic programme of peripatetic work, bringing veterinary treatment within easy reach of all, can be continuously maintained. The ultimate scheme for the Province contemplates the maintenance of a Veterinary dispensary in at least every tahsil town, each supporting one peripatetic and one dispensary assistant. It must be some time, however, before funds will permit of the attainment of this counsel of perfection. Meanwhile in my letter No. 615-119, dated the 10th February 1902, I have addressed all Commissioners of Divisions with a view to obtaining their co-operation in bringing veterinary treatment within easier reach of the rural population. I have suggested, with the previous approval of the Hon'ble the Chief Commissioner, that no further Veterinary dispensaries should be opened by District Councils, until they can see their way clearly to providing for the regular employment of two Veterinary Assistants at each, and that Municipal Committees, which, directly and indirectly, are the greatest gainers by the maintenance of a Veterinary dispensary, should be asked to contribute to the support of Veterinary dispensaries situated within their limits, so as to liberate funds for employing second Veterinary Assistants or opening new dispensaries. The following Municipalities in the Nagpur Division have agreed to contribute the sums noted against them towards the maintenance of the dispensaries in their districts:—

		Rs.
Wardha District.	Wardha	120
	Hinganghat	200
	Arvi	200
	Pulgaon	30
	Deoli	20
Nagpur District.	Civil Station Sub-Committee	150
	General Municipal Committee	150

The Wardha and Mandla District Councils have also applied for the services of a second Veterinary Assistant for peripatetic work. In my letter abovementioned I further suggested that in future the touring of peripatetic Veterinary Assistants should be directed to dealing thoroughly with smaller areas, rather than, as has hitherto been the case, to covering a large amount of ground. This result would be best attained by halting for considerable periods and opening camp dispensaries at important centres of cattle dealing, and by halting there until no more cattle remain to be dealt with in the neighbourhood. The next few touring seasons alone can show whether any attempts have been made to carry out these suggestions, and with what success.

Re-organization of staff.

44. The orders of the Government of India on the scheme for the re-organization of the Provincial Civil Veterinary Department were received in January 1902. With a view to attracting a better class of Assistant, the scale of pay has been fixed at a minimum of Rs. 30 per mensem, rising by biennial increments of Rs. 2 to Rs. 50, with a monthly allowance of Rs. 10 to the Assistant engaged on touring work. Owing to difficulties in the apportionment of this allowance where touring is done partly by each Assistant, it has since been found necessary to abolish it and substitute ordinary travelling allowance under the rules. Rules for the control and guidance of the Department under the re-organization scheme have been drawn up and sanctioned by the Hon'ble the Chief Commissioner. Some few years must elapse before the effect of this scheme upon the recruitment of the Department can be known, but there can be no doubt that in the past the class of student sent for training to the Ajmer School has not been good enough to provide Veterinary Assistants capable of pushing the work of the Department. The general standard of work is low, but with two exceptions I have inflicted no punishments. The two exceptions are Suliman Mirza and Abdul Ghani Khan. The former, as Veterinary Assistant, Raipur, had to be suspended for misconduct, and was transferred to Hoshangabad. There, he was dismissed for insolence and insobriety. Abdul Ghani Khan, Veterinary Assistant, Mandla, for gross disobedience to the orders of the Deputy Commissioner, was reduced from Rs. 30 to Rs. 25 and transferred as 2nd Assistant to Jubbulpore.

Ajmer students.

45. Muhammad Abdul Kadir and Gaurishanker, the two scholarship-holders at the Ajmer Veterinary College, have both passed out since the commencement of the year and been appointed to posts on the Provincial list of Veterinary Assistants. Their places were filled up by C. N. Subannah and Kunj Bihari Lal, both of whom are well reported of and should pass out in 1903.

Prizes for cattle-breeding.

46. The Government of India have sanctioned a grant of Rs. 1,000 for the improvement of breeds of cattle by the systematic grant of prizes for well-bred animals at cattle fairs. After consultation with the Deputy Commissioners of the chief cattle-rearing districts, it has been decided to concentrate the grant on the following fairs:—

	Rs.
Singaji Fair, Nimar	400
Chappara Fair, Seoni	300
Mahakali Fair, Chanda	300

A set of rules in Hindi, Marathi and Telugu has been drawn up and widely published, and it is hoped that the desired stimulus to cattle-breeding may be produced in time by the concentration of the grant, distributed in the above-mentioned manner, in a few substantial prizes to really first class animals of the selected breeds. But the experiences of the first year are not very hopeful. The Singaji fair opened on the 2nd of October 1901, and lasted nine days. The judging committee, consisting of the Deputy Commissioner, the District Superintendent of Police, and the Senior Veterinary Inspector, were able only to award Rs. 60 in prizes. The Chappara Fair opened on the 15th January 1902, and lasted about a month: but no prizes were awarded, the attendance of cattle being very small owing to the rival attractions of the Hindu festival of Chouth and other fairs. These results are not very encouraging, but it should be borne in mind that the matter has not yet had time to attain a publicity wide enough to produce any appreciable effect.

Rinderpest inoculation.

47. Experiments in the inoculation of cattle against rinderpest were made during the year at Nagpur by the Imperial Bacteriologist, with a view to ascertaining the strength of the doses of serum required by the local cattle. The experiments were made on the Government Experimental Farm, where a cattle kraal was erected and the most careful arrangements made, with complete success, for preventing the spread of the induced disease beyond the limits of the kraal. Two bulls, three sheep, and

20 bullocks were experimented with. The two bulls and three sheep, which were used as control animals, received no dose of protective serum. No report has yet been received from the Imperial Bacteriologist, and I am therefore unable to give details of the results of the experiment. In the meantime arrangements have been made by me for the training of all Veterinary Assistants at the Mukhteswar Laboratory in methods of inoculation. One Veterinary Assistant is sent at a time for training and six have now passed out successfully. Rinderpest is a common disease in these Provinces, and I hope that the Superintendent will be able to start the inoculation system of treatment.

Cattle-breeding Farm.

48. The Hon'ble the Chief Commissioner has sanctioned the opening of a cattle-breeding farm in the Telenkheri Fodder Reserve. The object of this farm is to maintain a herd of the best cows of the local Arvi cattle breed for the breeding of cattle for agricultural purposes. The buildings have been completed; and since the close of the year the farm has been started with a stock of one Arvi bull, and thirty-three cows selected from the well known Jaitpur herd.

Horse-breeding.

49. There were 5 horse stallions and 1 donkey stallion maintained by Government in the districts of Saugor, Damoh and Narsinghpur under the supervision of the District Superintendents of Police. One horse stallion died during the year from colic. The results of the maintenance of Government stallions leave much to be desired. The following table shows that the total number of coverings effected by all the stallions during the year was 134, a very poor result, which shows that the services of the stallions were not fully utilized :—

District.	Name of stallion.	Number of mares served.
Saugor	Shumsher	7
	Sunbeam	5
	Yakub Khan	26
	Fussy	32
	Burj (Donkey)	9
Damoh	Shamsher	26
Narsinghpur	Sultan	29

The results of the coverings of 1900-01 shown in detail in the list below are still less encouraging :—

District.	Name of stallion.	Number of mares covered.	RESULTS OF COVERINGS.			
			Number of Mares.			
			Foaled.	Miscarried.	Died while pregnant.	Not held.
Saugor ...	Shumsher ...	19	5	4	2	8
	Yakub Khan	16	3	4	2	7
	Fussy	11	1	3	2	5
	Burj (Donkey)	11	1	3	2	5
Damoh ...	Sultan	18	2	...	...	16

Such returns show that at present the expenditure on horse-breeding is money wasted. It is possible that improvement may result if the present arrangements are re-organized by the Superintendent and placed upon a proper footing. Some of the present stallions are useless animals. But I doubt if horse-breeding can ever be made a success in these Provinces. The people have no great liking for horse-breeding and the number of suitable mares maintained by them is small. My own opinion is that the attempt at horse-breeding should be abandoned and the money devoted to cattle-breeding, which the people appreciate and which would assist. the agriculture of the Province. The Superintendent of the Civil Veterinary Department has been asked to make a full enquiry into the present operations during his cold-weather tour in 1902-03. I have also arranged to supply him with more detailed information concerning the available horse-breeding stock in Saugor, .Damoh and Narsinghpur. The Deputy Commissioners of these districts have been asked to expand their stock returns for 1902-03 so as to show separately stallions, mares, and geldings in the classes of ponies and horses. On the basis of the results of these enquiries it will be possible to come to a decision whether horse-breeding should be abandoned altogether or a fresh start made upon a proper plan.

Mule-breeding.

50. A donkey stallion, Burj, is also kept at Saugor, but the results have hitherto been even less promising than those of the horse stallions. There is popularly reported to be a prejudice against mule-breeding in these Provinces, and the whole subject will be enquired into on tour by the Superintendent.

Live-stock Return.

51. Details of the live-stock of the Provinces on 31st May 1902 are given in the annexed Table B. All heads show a considerable increase. The number of young stock has risen by 290,994, or 17·6 per cent., mainly in the districts of the Jubbulpore Division. The increase is especially marked in Damoh, where it amounts to no less than 75 per cent. on the previous year's figures. The increase under all heads may in part be accounted for by improved enumeration and the renewal of famine-depleted stocks: unfortunately, in some parts, particularly the northern districts, it represents also deterioration from an arable to a pastoral country. The number of agricultural cattle, however, has increased by 81,369 or 3 per cent., the Nerbudda Division alone showing a decrease under this head amounting to 24,726 or 5 per cent. There was a considerable export of bullocks from the Nerbudda valley to the Bombay Presidency. The increase is greatest in the Nagpur Division, where it amounts to 39,133 or 6 per cent.

Cattle disease.

52. Cattle disease prevailed in several districts in various forms, rinderpest, foot and mouth disease, anthrax and cowpox. The mortality was heavy in Bhandara and Balaghat where the number of cattle which succumbed amounted to 18,000 and 10,000 respectively. The number of deaths in Bilaspur was also large, amounting to 23,700.

VI.—Co-operation with Enquiry under Imperial Control.

The Meteorological Department.

53. A report on the efficiency of the registration of rainfall was submitted to the Meteorological Reporter to the Government of India, with my letter No. 2471-107, dated the 11th June 1902, the most important part of which is embodied in the following remarks. During the year under report two new raingauge stations were established at Harrai and Tamia in the jagirs of the Chhindwara District, and the following raingauge stations in the Feudatory States of Chhattisgarh were added to the list of raingauge stations maintained in these Provinces, for which statistics are published :— (1) Rehrakol, ( ) Sonpur, (3) Bolangir, (4) Kawardha, (5) Chhuikhadan, (6) Khamaria, (7) Khairagarh, (8) Dongargarh, (9) Raj-Nandgaon, (10) Kanker, and (11) Sakti. The additional rainfall data of these tracts gives information for an interesting area and throws light upon the distribution of rain by cyclonic storms passing from Orissa into the Central Provinces. No rain-registering station was abolished during the year, so that returns from 85 raingauge stations were received

against 72 in the preceding year. Ten of these are observatories under the superintendence of the Meteorological Department, nine are managed by the Medical Department, sixteen by the Feudatory States, and the remainder are in charge of either Kanungos or Police Muharrirs. Besides the seven sanctioned raingauge stations in the Chanda District there is one at Allapilli, maintained by the Forest Department, and four in the Zamindari Estates of Ambagarh Chauki, Panabaras, Gewardha, and Rangi, maintained by the Court of Wards. The rainfall statistics which are furnished to the Deputy Commissioner, keep him informed of the agricultural prospects in these outlying tracts. There were 20 cases against 22 in the previous year in which the weekly rainfall returns received from Deputy Commissioners were incorrect. The number of inspections of raingauge stations by superior officers during the year under report reported to this office is 94 against 63 in the preceding year, and 45 in the year 1899-1900. The raingauge stations which do not appear to have been inspected are those at Betul, Bilaspur and Korba. The number of raingauges inspected by Tahsildars was 78, which is the same as the number reported in the previous year. No inspections by Tahsildars were made in the Damoh, Wardha, Bhandara and Sambalpur Districts. The Tahsildars in the Narsinghpur District made some inspections, but the number has not been stated by the Deputy Commissioner. The results attained during the year under report thus show some improvement over those of the previous year.

The Department of the Reporter on Economic Products.

The lac industry.

54. The enquiry into the lac industry in these Provinces and the collection of specimens of the wood from which toys are made, of the toys themselves, and of shell lac and of all the materials used in colouring them, has been completed since the close of the year. A bulletin on the subject (No. 8 of 1902) has been published, and a copy, accompanied by specimens, was forwarded to the Reporter in September 1902.

Indian edible gums.

The collection of Indian edible gums continued to be made during the year under report with the assistance of the officers of the Forest Department. Collections were received from the Chhindwara, Chanda, Nagpur, Nimar, Wardha, Bilaspur and Raipur Districts, which were sent to the Reporter on Economic Products.

Tanning materials.

Two pieces of the wood of the tree *Ougenia dalbergioides* known in vernacular as Tensa, together with two pounds of gum of the same tree, collected by the Forest Divisional Officer, Seoni, were forwarded to the Reporter on Economic Products to the Government of India in June 1901. Dr. Watt in his Annual Report of the Industrial Section of the Indian Museum for the year 1901-02 states that the sample of gum afforded an opportunity of testing a true but rarely occurring kino. The report adds that it exists in ruby coloured fragments, which are perfectly soluble in water, and possess the intense astringency of Malabar kino.

Andropogon sorghum.

Nineteen varieties of *Andropogon sorghum* including flowering heads, stalk and seed, from Nagpur, 1 from Narsinghpur, 4 from Damoh, 1 from Chanda and 4 from Saugor were sent to the Reporter on Economic Products to the Government of India. These varieties are being grown at the Nagpur Farm to test their agricultural value.

Investigation into the forms of *Dioscorea*—yams.

The attention of District Officers, whose co-operation was required in the collection of specimens of the numerous forms of *Dioscorea* (yams), whether wild, cultivated, indigenous or exotic, was re-invited to the matter, and considerable progress has been made in all districts except Saugor, Damoh, Mandla and Chanda. The District Officers of Raipur and Sambalpur have contributed specimens from parts of their districts. The nineteen varieties of tubers used by the wild tribes of Balaghat, which were transmitted to the Reporter last March, have been described by that officer as the most interesting sets hitherto received in this connection, though it is unfortunate that most of the specimens were incomplete, showing neither flowers nor fruits. The Forest Divisional Officer has promised to obtain complete sets of each sample in their flowering and fruiting stages.

55. Collections were made of samples of the cotton seed of the varieties grown in the Nagpur, Wardha, Chanda and Nimar Districts, which were sent to the Agricultural Chemist for analysis. These samples were analysed to find out the percentage of oil, and some of the results have been published in Bulletin No. 9 of 1902, which deals with the cotton-seed oil industry. This bulletin has aroused considerable interest.

The Department of Agricultural Chemistry.

Cotton-seed oil.

Samples of (*a*) country-made oil-cakes, (*b*) the "bhusa" (the pods and leaves from the threshing floor) of the principal pulses, and (*c*) the straw of wheat and rice, were collected from the districts of Jubbulpore, Chhindwara, Seoni, Hoshangabad, Saugor, Chanda, Raipur and Sambalpur. These samples were sent to the Agricultural Chemist for analysis.

Cattle foods.

In paragraph 37 of the Report of the Department of Land Records and Agriculture it was stated that arrangements were being made for the supply to the Reporter of further samples of the grain of the vetch known as lakh, and that samples were awaited from Jubbulpore, Raipur, Seoni and Sambalpur. The first two named districts sent samples direct to the Reporter, while the Deputy Commissioner, Sambalpur, reported that the seed is not available in his district; the Deputy Commissioner, Seoni, sent some seed in June when it was forwarded to the Reporter. The information furnished by the Deputy Commissioner regarding the local distinction between the two varieties of the vetch was found by the Reporter to be of much interest, a copy of the report being sent by the Reporter to the Imperial Institute. The investigation of the form of paralysis caused by eating lakh is a matter of great importance to the northern districts of these Provinces, and I believe that the disease is much more common in the adjoining Native States of Central India. It is to be hoped that something practical will result from its investigation.

Lathyrus sativus.

VII.—Museums.

56. The Provincial Museum at Nagpur and the local one at Raipur are still the only institutions of this class in the Provinces. The daily average number of visitors to the Nagpur Museum was 358. Some useful additions have been made to the Library. In accordance with my suggestion last year some funds have been utilized in purchasing new exhibits, the principal of which are Sialkot metalware, Belgaum carved wood-work, Dacca muslin and a Madras fly-shuttle loom. The most important improvement now required in the Museum is that the stock should be carefully gone over and all useless articles condemned and got rid of. The next step is to classify and arrange the remaining exhibits of value. For this purpose good wall cases are much to be desired. The number of visitors to the Raipur Museum was larger by 18,238 than in the preceding year. Specimens of tassar silk and of articles of brass manufacture were added to the collection. I suggested to the Secretary, District Council, Raipur, his obtaining a collection of local manufactures of the Chhattisgarh Division, such as brass work, copper work, cloth, silk and cotton, and the like. Some new show cases were added to the Museum. The Secretary of the District Council (Mr. H. S. Gour, Barrister-at-Law) has shown considerable interest in the institution.

VIII.—General.

57. Of late years there appears to have been a considerable expansion of the industry of the distillation of the essential oil of *Andropogon schœnanthus*, known as "rusa" grass. As little is known about this industry, which is of economic importance, the Conservator of Forests, Northern Circle, was asked by me to allow Forest Divisional Officers to make special enquiries and report the result. The Nimar District has always been an important centre of the industry, so much so that the oil is commercially known as Nimar oil. The industry appears to be extending in that district, whilst it is also carried on in the districts of Hoshangabad, Mandla and Seoni. It may be that it has also spread to other districts of the Provinces. With encouragement and proper management there seems no reason why it should not become an important industry.

Rusa-grass oil.

Agave (the aloe plant and its fibre).

58. Copies of a bulletin prepared by this Department on Agave (the aloe plant and its fibre) were distributed to all Deputy Commissioners and Settlements Officers in December 1901, who were asked carefully to enquire during the camping season as to the possibility of extending (*a*) the cultivation of the plant and (*b*) the industry of extracting fibre, and to furnish this office with a brief report at the close of the season, special reference being made to the castes who are at present or might be in future engaged in the industry. The results of the enquiries of District officers show that there is no regular cultivation of the aloe plant in the Provinces. In some parts, however, the aloe plant has been grown as hedges round small fields or gardens. Some Deputy Commissioners are of opinion that caste prejudices would interfere with the industry if it could be successfully started. In Damoh, where the Deputy Commissioner had aloe fibre extracted in one of the estates under the Court of Wards, the work, it is reported, was very distasteful to the people, and is looked upon as a degrading form of labour. One of the drawbacks to the extension of the industry is that the manufacture of the aloe fibre is a tedious process, and the contact of the juice and pulp with the body causes irritation. It is very doubtful whether in these Provinces aloe will ever be grown on a large scale. The plant takes four years to come to maturity, and is not such a profitable fibre crop as san hemp (*crotolaria juncea*).

Cultivation of tassar-silk worms.

59. Deputy Commissioners were requested to make an enquiry into the rearing of tassar-silk worms. The management of forest areas set aside for this purpose has, hitherto, been under the Forest Department, but the Administration now desires that such areas should be disforested and made over to the Revenue Department. The orders contemplate that areas should be excised sufficient not only for actual tassar baris, but for ryotwari cultivation in addition, so as to establish a settled village. Deputy Commissioners have accordingly been asked to make a detailed enquiry during the camping season into the state of tassar cultivation in their districts, and of the steps which it is necessary to take in order to give effect to the wishes of the Administration. I am not sanguine that this proposal will succeed, for the class of persons who rear tassar-silk worms are not likely to settle down to ryotwari cultivation.

I have the honour to be,

Sir,

Your most obedient Servant,

F. G. SLY,

Director of Agriculture,

Central Provinces.

LIST OF APPENDICES.

STATEMENT A.—List of Agricultural Implements which have been tested in the Central Provinces.

B.—Showing the number of Agricultural Stock in each district of the Central Provinces.

A.

List of Agricultural Implements which have been tested in the Central Provinces during the year ending 31st March 1902.

[Those which have met with marked success are shown in Italics in Column 2.]

No.	Name.	Use.	Special advantage.	Price.	Where procurable.	Opinion of Official Reporter.	Extent to which used by native agriculturists.
1	2	3	4	5	6	7	8
				Rs. a. p.			
1	*Swedish Plough* ...	Ploughing and inverting the soil.	Efficiency in ploughing and inverting the soil, especially in breaking up grass lands.	21 10 0	Ankerbank's Red Shop and Company, O'sverums, Sweden.	A most useful plough for black soil. Has continued to do very good work on the Nagpur Farm.	A considerable number are sold by the Nagpur Farm.
2	*Mayfurth's Hand-thresher.*	Threshing any crop ...	Cheapness and rapidity in threshing wheat.	127 6 0	Mayfurth and Company of Frankfort-on-Maine, Germany.	A useful instrument, but which has not caught on with Native cultivators.	One was purchased for use in the Hoshangabad District, but the non-crushing of the straw is considered by the people a great defect.
3	*Iron Roller Sugar Mill.* (1) Three Rollers.	Extracting juice from sugarcane.	Efficiency in the extraction of cane juice and improvement in quality of syrup.	128 0 0	Messrs. Thomson and Company, Behea.	The three-roller mill has done fairly good work.	Established in one district (Betul) and coming into use in another (Chanda).
	(2) Two Rollers.			50 0 0			
4	*Steel Roller Mill* (Rogers).			95 0 0	A. Rogers, Esq., Muzaffarpur, Tirhoot, Bengal.	Do.	One purchased by a landlord of the Bhandara District, and much appreciated.
5	*Dell's Winnower* ...	Winnowing grain ...	Winnowing and cleaning threshed grain.	265 0 0	Messrs. Dell and Company, Mark Lane, London.	Does fairly good work on the Nagpur Farm, but is now superseded by the Fanning Mill manufactured by Mr George D. Harder of Cobleskill, New York, America.	Used by grain export agents, but not by cultivators.
6	*Walter A. Wood's Sultry Mowar and Rake.*	Reaping grass ...	Rapidity in hay-making.	487 10 2	Messrs. Macbeth and Company, Bombay.	Worked very satisfactorily on grass lands at Pachmarhi, but on the Telinkheri reserve the soil is too stony for the class of machine.	*Nil.*

List of Agricultural Implements which have been tested in the Central Provinces during the year ending 31st March 1902.—(Concld.)

[Those which have met with marked success are shown in Italics in Column 2.]

No.	Name.	Use.	Special advantage.	Price.	Where procurable.	Opinion of Official Reporter.	Extent to which used by native agriculturists.
1	2	3	4	5	6	7	8
				Rs. a. p.			
7	*Macarthy Hand Cotton Gin.*	Ginning cotton ...	Rapidity in ginning, and saving of labour.	220 0 0	Messrs. N. D. Maxwell and Company, Bombay.	An excellent small gin which works satisfactorily and does not injure the seed.	.....
8	*Hay Press* ...	Pressing grass ...	Preserves the aroma of grass, and facilitates its storage.	516 12 9	Obtained from the Managing Director of Tramway Company, Bombay.	It works very satisfactorily, and preserves the quality and aroma of the grass during the whole time that it remains compressed in bales.	.....
9	Martin's Plough ...	.....	... ..	7 0 0	Mr. T. Martin, Agra ...	This is too delicate an implement for our black soil.	.. ..
10	Kolar Mission Drag Harrow.	.....	.....	28 0 0	Superintendent, Kolar Mission, Kolar.	This is too light to be of much service.	.....
11	Meston Plough ...	.....	.....	6 14 6	Director of Land Records and Agriculture, United Provinces of Agra and Oudh.	This is too light for use on our heavy black soil.	.....
12	*Cook's Heavy Beam Plough*	..	.....	38 8 0	Cook and Sons, England ...	Proved to be of exceptional service in breaking up the new stiff soil at Telinkheri Farm.	.....
13	*Hand Force Pump* ...	... ..	.....	130 0 0	Messrs. Hayward and Tyler, Upper White Cross Street, London, E. C.	This is a useful pump for drawing water from wells for drinking and household purposes, and can be easily worked by one person. After the pump is fixed the well can be covered up so as to prevent its poilution. (Tried on the Farm, 1899-1900).	....

14	*Fodder Cutter and Shredder.*	.....	Rapidity in cutting juar stalks (*Karbi*) into small lengths the whole of which cattle are able to consume.	214 14 0	Harder and Co., Empire Agricultural Works, Cobleskill, New York.	A very useful implement for cutting juar stalks into quarter-inch bits, which cattle eat with great ease. It effects a great saving in fodder as nothing is wasted. It cuts very fast, and is easy to work. A man working at the machine for half a day can produce chopped food for 30 head of cattle. It is also a very good machine for chopping maize stalks. A very sweet silage can then be prepared out of this material that would otherwise be wasted.	Several have been sold at the Nagpur Farm.
15	*Cook's Turner-wrest Plough.*	.....	.....	Not known.	Cooke and Sons, England ...	A very strong plough which gives work equal to the Swedish Plough No. 1 and has the additional advantage of working along the furrow in both directions. It gave excellent results in breaking up waste land, but its price is too high for native cultivators.	.....
16	Kent's Corn Planter ...	Sowing maize ...	.....	48 0 0	Messrs. Marvin-Smith and Company, United States of America.	Does not work satisfactorily.	.....
17	Mathew's Combination Drill Double-wheel with hoe.	.....	.....			A useful implement for sowing and weeding kharif crops, but is more suitable for garden than field work.	.....
18	*Cornsheller* ...	Shelling maize ...	.....			A useful little instrument that saves much labour.	.....
19	Hand Sieve ...	Cleaning grain ...	.....	2 12 0	Assistant Director of Land Records and Agriculture, United Provinces of Agra and Oudh, Cawnpur.	No improvement over those already in use.	.....

B.

Statement showing the number of Agricultural Stock in each District of the Central Provinces during the Agricultural year ending 31st May 1902.

	Districts.	Bulls and bullocks.	Cows.	Male buffaloes.	Cow buffaloes.	Young stock (calves and buffalo calves).	Sheep.	Goats.	Horses and ponies.	Mules and Donkeys.		Camels.	Total of cols. 1 to 10.	Percentage by which col. 11 exceeds (+) or is less than (−) the figure of previous year.	Plough-cattle (included in columns 1 to 5).	Ploughs.	Carts.
										Mules.	Donkeys.						
		1	2	3	4	5	6	7	8	9		10	11	12	13	14	15
Jubbulpore Division.	Saugor ...	95,116	132,157	2,717	61,266	179,801	14,146	17,898	7,762	569	1,000	25	512,457	+12	93,399	43,504	13,383
	Damoh ...	96,592	89,706	3,462	35,478	144,418	13,260	20,662	4,117	53	1,617	...	409,365	+30	76,975	36,444	4,983
	Jubbulpore ...	178,363	121,563	9,414	44,431	141,110	14,176	29,861	9,976	179	403	16	549,492	+1	163,249	72,130	4,699
	Mandla ...	108,101	163,298	7,226	29,879	51,562	1,830	8,088	4,383	3	18	...	374,388	+24	78,454	39,478	1,478
	Seoni ...	88,125	80,115	7,675	22,528	58,626	844	11,142	5,838	11	152	3	275,059	+1	81,235	32,033	14,890
Total Jubbulpore Division ...		566,297	586,839	30,494	193,582	575,517	44,256	87,651	32,076	815	3,190	44	2,120,761	+12	493,312	223,589	39,425
Nerbudda Division.	Narsinghpur ...	59,660	48,841	1,578	21,671	70,452	6,921	20,401	6,269	285	3,779	7	239,864	−5	53,924	26,862	13,079
	Hoshangabad ...	120,554	73,383	3,992	28,960	90,934	5,596	20,867	4,161	93	2,106	40	350,686	−10	109,301	31,079	26,257
	Nimar ...	96,014	59,838	2,370	31,770	58,424	1,630	29,247	2,171	42	1,410	8	282,924	−1	77,561	31,660	22,537
	Betul ...	100,093	60,563	3,089	15,844	71,987	4,020	30,560	5,052	1	494	7	291,710	+4	85,249	31,586	14,416
	Chhindwara. Khalsa ...	122,437	88,298	3,564	22,911	80,904	4,542	40,452	6,808	3	643	8	370,570	+35	104,059	38,084	20,307
	Chhindwara. Jagirs ..	17,555	21,000	530	4,090	23,000	290	2,600	1,100	24	...	...	70,189		13,580	7,800	400
Total Nerbudda Division ...		516,313	351,923	15,123	125,246	395,701	22,999	144,127	25,561	424	8,456	70	1,605,945	+5	443,674	167,071	96,996

Nagpur Division.	Wardha	...	121,694	71,027	3,514	23,901	52,253	14,646	63,774	2,813	...	2,612	...	356,234	+ 5	101,718	20,068	27,230
	Nagpur	...	225,709	128,089	5,745	30,856	82,545	34,844	100,539	4 443	43	1,832	21	614,666	+ 9	190,444	45,828	38,607
	Chanda ...	Khalsa ...	144,048	150,257	12,696	32,270	84,354	73,446	43,783	945	...	136	...	541,935	+15	118,380	46,991	39,775
		Zamindari....	33,177	45,768	7,077	4,682	31,530	10,566	308	235	...	...	...	133 343		24,756	9,998	8,441
	Bhandara...	Khalsa ...	120,300	95,045	14,200	20,543	56,482	4,268	47,425	1,261	...	140	...	358,664	...	115,489	48,137	33,042
		Zamindari...	44,736	30,410	8,596	3,843	4,871	137	13,453	458	...	2	...	106,506		49,398	22,302	15,838
	Balaghat....	Khalsa ...	66,951	60,436	12,313	6,420	28,526	272	16,143	1,063	...	10	...	192,134	+ 5	66,103	30,680	20,925
		Zamindari...	18,424	16,176	3,432	1,944	12,329	143	4,415	387	...	...	...	57,250		18,248	8,227	5,252
	Total Nagpur Division ...		775,039	596,208	67,573	124,459	352,890	138,322	289,840	11,605	43	4,732	21	2,360,732	+ 8	684,536	232,231	189,110
Chhattisgarh Division.	Raipur ...	Khalsa ...	317,599	260,671	80,496	25,535	211,010	44,549	52,334	7,843	...	211	8	1,000 256	−11	357,061	116,983	46,040
		Zamindari...	95,834	69,821	15,736	10,178	56,281	17 782	16,652	1,553	...	28	5	283,870		99,791	34,712	9,302
	Bilaspur ...	Khalsa ...	197,000	183,559	50,290	17,214	134,140	12,960	26,369	5,658	...	37	...	627,227	+22	247,290	68,339	17,770
		Zamindari...	85,851	95,876	17,606	7,106	66,055	1,119	20,551	2,411	...	8	...	296,583		103,457	32,944	9,727
	Sambalpur.	Khalsa ...	145,335	86,210	23,505	5,740	48,535	14,690	28,480	1,200	...	8	...	353,703	+ 1	161,552	76,105	12,150
		Zamindari...	94,724	75,057	20,083	6,933	78,577	6,292	23,037	1,138	...	...	...	305,841		107,811	51,782	10,793
	Total Chhattisgarh Dn. ..		936,343	771,194	207,716	72,706	594,598	97,392	167,423	19,803	...	292	13	2,867,480	+ 1	1,076,962	380,865	105,782
	Provincial Total ...		2,793,992	2,305,164	320,906	515,993	1,918,706	302,969	689,041	89,045	1,282	16,670	148	8,954.916	+ 6	2,698,484	1,003,756	431,317

SECRETARIAT PRESS, NAGPUR :—A. H. R., 26-2-1903—650.

REPORT

ON THE

DEPARTMENT OF AGRICULTURE,

CENTRAL PROVINCES,

FOR THE YEAR

1902-03.

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TABLE OF CONTENTS.

	Page.	Para.
I.—Prefatory.		
Special Establishment	1	2
Changes in the personnel of the Department	1	3
Touring	1	4
II.—Agricultural Education.		
The Agricultural School, Nagpur	2	5
The English Class	2	6
The Normal Class	2 & 3	7
The Malguzari Class	3	8
General	3	9
The general educational system of the Provinces as affecting Agriculture	3 & 4	10
Publication of agricultural information	4 & 5	11
III.—Agricultural Enquiry and Experiment.		
(a) Experimental Farms.		
Nagpur Experimental Farm	5	12
Character of the season	5	13
Experiments with manures	5	14
Varieties of crops	5 & 6	15
Plant breeding experiments	6	16
Plant diseases	6	17
General	6	18
Telinkheri Farm	6	19
The Sewage Farm	6	20
Experimental Farms, Raipur and Hoshangabad	6 & 7	21
(b) Other Agricultural Experiments and Enquiries.		
Introduction of juar and cotton cultivation in Chhattisgarh ...	7 & 8	23
Introduction of cotton cultivation in the Feudatory States of Nandgaon and Khairagarh	8	24
Improvement of the method of cultivating kharif crops in the Hoshangabad District	8	25
Ensilage experiments	8	26
Fodder-cutting experiments	8	27
Introduction of *sorghum collier* as a fodder crop	8 & 9	28
Sugarcane cultivation. Improved methods of gur-making ...	9	29
The Meagher system of sewage disposal	9	30
Insect pests—grasshoppers	9	31
The eradication of smut in juar	9 & 10	32
Rust in wheat	10	33
The irrigation of rice from wells	10	34

	Page.	Para.
Field embankments in Hoshangabad	... 11 & 12	35
Crop-cutting experiments	... 12	36
District Agricultural and Industrial Associations ...	... 12	37
IV.—Horticulture.		
General	... 12 & 13	38
V.—Veterinary.		
Office of Superintendent, Civil Veterinary Department	... 13	39
Veterinary Dispensaries	... 13	40
Re-organization of staff	... 13	41
Prizes for cattle-breeding	... 14	42
Cattle-breeding Farm	... 14	43
Cattle disease	... 15	44
Horse and Mule-breeding	... 15	45
Live-stock Return—(Statement B)	... 15	46
VI.—Co-operation with Enquiry under Imperial Control.		
The Meteorological Department	... 15	47
The Department of the Reporter on Economic Products (Edible gums)	... 16	48
Investigation into the forms of dioscorea—yams ...	... 16	49
Lathyrus Sativus	... 16	50
Other collections	... 16	51
The Department of Agricultural Chemistry ...	... 17	52
VII.—Museums.		
Museums	... 17	53
VIII.—General.		
The Tassar-Silk Industry	... 17	54
The hand-weaving industry	... 18	55
Bassia latifolia	... 18	56
Conclusion	... 19	57

No. 3850.
3

FROM

F. G. SLY, ESQ., I. C. S.,

COMMISSIONER OF SETTLEMENTS AND AGRICULTURE,

Central Provinces,

TO

THE SECOND SECRETARY TO THE HON'BLE THE CHIEF COMMISSIONER,

REVENUE DEPARTMENT,

Central Provinces.

Nagpur, the 20th August 1903.

SIR,

I have the honour to submit the Annual Report on the Department of Agriculture for the year ending the 31st March 1903.

I.—PREFATORY.

Special establishment.

2. The organization of the Department was described in the previous year's report. The special establishment employed consisted of one Assistant Director and six Agricultural Assistants. The appointment of Assistant Director has been included in the cadre of Extra-Assistant Commissioners, and by order No. 1675, dated the 27th February 1903, Mr. R. S. Joshi, Assistant Director, was appointed an Extra-Assistant Commissioner, 4th grade, on Rs. 400. This promotion was most thoroughly earned. The re-organization scheme provided also for two Agricultural Superintendents on monthly salaries varying from Rs. 100 to Rs. 200, but Mr. Joshi has been able to supervise alone the present small scale of operations, so that these appointments will not be filled until there is an expansion of the work.

Changes in the personnel of the Department.

3. The post of Director was held by me and that of Assistant Director by Mr. R. S. Joshi throughout the year. The staff of Agricultural Assistants remained unchanged except in one case, in which an Agricultural Assistant (Paramanand) was reverted to his substantive appointment of Additional Revenue Inspector in the Chanda District, because he showed a want of the tact that is necessary in introducing agricultural improvements amongst the people. With this single exception, the Agricultural Assistants have worked well. They are all passed students of the Nagpur Agricultural School, and a continuous supply of good men should be ensured by the system under which the best students now receive further practical training as Probationary Overseers at the Nagpur Farm. The work of the Department has not been hampered by any difficulty in securing fairly good practical men for subordinate positions as Managers of Demonstration Farms and the like, but difficulty is experienced in obtaining good trained agriculturists for the more important appointments of Experimental Farm Superintendents and the like.

Touring.

4. During the year I myself toured in the districts of Raipur, Bilaspur and Hoshangabad and inspected the Demonstration Farms. Mr. Joshi had an exceptionally hard year's work of almost continuous touring connected with the supervision of Demonstration Farms, the starting of new Experimental Farms, the inspection of agricul-

tural demonstrations throughout the province and attendance at meetings of the District Agricultural and Industrial Associations. The demand upon his time was so great that he was unable to meet all calls, and I was obliged to send Mr. Bhayalal Dube, Nagpur Farm Superintendent, to attend the Association meetings of four districts. Requisitions for the attendance of the Assistant Director at such meetings are more numerous than it is possible for him to comply with under the present arrangement, much time being wasted in travelling to and from distant parts of the Province. I have, therefore, found it necessary to prescribe a roster for the dates of meetings, so that the Assistant Director will be able to make one continuous tour for this purpose. Mr. Joshi accompanied the Inspector-General of Agriculture on a special tour to the Experimental Farms of the Bombay Presidency, from which he derived considerable benefit. He also was in charge of a small party of officials and non-officials sent by Government to the Delhi Arts Exhibition. Mr. Joshi reports that the party derived considerable advantage from their visit to Delhi, where they had an opportunity of seeing specimens of the art work of all parts of India and of examining the best designs.

II.—Agricultural Education.

The Agricultural School, Nagpur.

5. The Nagpur Agricultural School consists of three sections :—

Section I—The English classes, in which students pass through a two years' course of training in agriculture, preparatory to receiving appointments in the Subordinate Revenue and Agricultural Departments.

Section II.—The Normal classes, in which village schoolmasters undergo a course of training in agriculture for six months in order to qualify them to teach in village schools the agricultural lessons embodied in their Reading-books.

Section III.—The Malguzari class, in which the sons of landowners and others who intend to make farming their profession in life undergo a course of ten months' training in practical farming.

The English class.

6. There were four students in the senior class and 18 in the junior class. One of the students in the senior class failed to pass the final examination and of the 18 students in the junior class only 7 passed. The results of the examination in practical agriculture being unsatisfactory the award of the "Chowdhri Silver Medal" was withheld. The English classes were thus not very successful. There is some reason to believe that the teaching has not been so good as in the past. The failure may also in part be due to some students not having sufficiently good general educational qualifications. The year's work has shown the necessity for more strictly enforcing the rule regarding the educational qualifications for admission. But at the same time I believe that better results would have been obtained at the annual examination if the teaching staff had performed their duties more efficiently. Some of the masters have shown a lack of real keenness in their work, contenting themselves with merely delivering instruction in the class-room instead of taking a personal interest in the advancement of each student.

The Normal class.

7. The first session of the Normal agricultural class was attended by 52 schoolmasters of whom 50 appeared for the examination and 43 passed. The second session was attended by 67 students, of whom 29 were schoolmasters and 38 were students of the Normal Schools. The plague which occurred during the cold months rather disorganized this class, several students running away. The result was that of 67 students admitted at the beginning of the session only 60 remained on the roll and appeared for the examination. Out of these 43 passed and were granted certificates. The results are not so good as in some years, which is partly due to the raising of the standard. In some inspections of village schools I have found masters who have received certificates and are still incapable of teaching properly the agricultural lessons. The examination papers were revised by me to secure that the questions were limited to the lessons which the schoolmasters will themselves

teach and did not embrace a smattering of scientific agriculture. Again, an examination has been instituted in the village map and land records. This innovation should result in considerable improvement in the teaching of this subject in village schools. I do not therefore regard with regret the small proportion of passes in the examination this year, but I expect the masters to fulfil the requirements better in the future.

The Malguzari class.

8. Twenty-five students joined the Malguzari class but only 14 remained in training during the year, the others either leaving of their own accord when the plague was prevalent, or being rejected because of their unsuitability. Some of the students sent to the class were too young to appreciate the practical training given. Some were turned out when it was found that they did not intend to do the practical work themselves. The first year's working of the Malguzari class has given promise of success. I took part in the final examination and found that several students had really acquired some sound knowledge of farming.

General.

9. Important measures have been initiated to improve the equipment of the Agricultural School. The boarding-house was found to contain insufficient accommodation for the whole of the students; it has now been enlarged by the addition of a second quadrangle, which gives ample accommodation for all. The housing of all the students in one set of buildings, with accommodation for two resident masters, should lead to considerable improvement in the discipline. Provision is being made in the new building under construction as a Technical Institute for class rooms and laboratories of the Agricultural School. When this is completed, the school will be thoroughly equipped with excellent buildings A minor improvement is the provision of a magic lantern and a large set of slides to illustrate agricultural teaching. It is very gratifying to record that the school has been given two new endowments during the year. Rai Bahadur Chandra Kumar Chatterji, retired Extra-Assistant Conservator of Forests, has presented Rs. 500 for the endowment of a prize fund to be known as the "Napier Practical Agricultural Prize Fund" for the purpose of giving a prize annually to the writer, from amongst the students of the Agricultural School, Nagpur, of the best essay on some subject connected with practical agriculture. A second endowment of Rs. 400 has been made jointly by Rai Bahadur Chandra Kumar Chatterji, retired Extra-Assistant Conservator of Forests, Mr. Pandit Mukand Raghava Pathak, Civil Judge, Chhindwara, and Munshi Ganga Prasad Khatri, Extra-Assistant Conservator of Forests, Central Provinces, for the creation of "The Coronation Commemoration Prize Fund" for the purpose of granting a prize annually to the best student of the Malguzari class of the Agricultural School. The thanks of the Department of Agriculture are due to these gentlemen for their generous public-spirited gifts to the school. Five endowments have been presented to the school in the past two years, which is strong testimony to the interest taken in it by the public.

The general educational system of the provinces as affecting agriculture.

10. In paragraph 13 of last year's report, I mentioned some of the measures taken to adapt the system of primary education to the needs of the agricultural population. Further efforts have been made by the Department of Public Instruction to give education of a more practical nature by improving the system of teaching the use of the village map and land records, the nature of the village soils, the elements of the law of landlord and tenant, the native system of accounts, and the like. I have permitted village patwaris to assist in the instruction of the subjects of their profession, this official being appointed a member of the School Committee for this purpose. I may add that I have re-written the lesson on the law of landlord and tenant in order to bring it into agreement with the latest Tenancy Law. School gardens are a prominent feature of many villages, and I have found some of them doing useful work outside the objects for which they were started, by introducing to the notice of cultivators varieties of vegetables unknown to them, with the result that a demand for seed has arisen. I have endeavoured to assist the movement by the supply free of cost to school

gardens of seed of suitable varieties of garden crops. I would specially refer to the good work done by the school gardens in the Feudatory States of Chhattisgarh by the introduction of juar cultivation. A more ambitious scheme of small school farms has been started in a few schools. These should furnish healthy employment to the pupils with instruction in nature study, but there should be no attempt to turn them into experimental farms, their work from an agricultural point of view being limited to the demonstration of some simple improved method of cultivation or new crop, which is thoroughly understood by the master. The Agricultural Department has promised to assist these school farms by bringing them under the regular inspection of the staff of Agricultural Assistants. Another new departure is the institution of an "Arbor Day," which is to be devoted to the planting of trees by school boys in school gardens, camping grounds and roadsides of the village. The day set aside as "Arbor Day" is the 9th November, in commemoration of the birthday of His Majesty the King Emperor. This may not be the best time of the year for tree planting, but for this province it is as suitable, if not more suitable, than any other fixed public festival.

Publication of agricultural information.

11. The *Hindi Agricultural Gazette,* which is issued monthly by this office, has done a great deal towards stimulating interest in the improvement of agriculture. The number of copies issued on payment has risen from 1,044 last year to 1,823 during the year under report. In addition the publication is issued free to 344 official and 200 non-official gentlemen, so that the total distribution now amounts to 2,367 copies. This large increase in the circulation shows that the journal is appreciated, and indeed I have received several communications from landowners giving expression to the advantages they have derived from reading it. Its monthly preparation is a difficult task, whilst it has given rise to considerable correspondence in answering the enquiries of readers. It is satisfactory to find that this effort to reach the agriculturists has met with such great success, the journal being an important agency for the dissemination of agricultural information.

In addition to the monthly journal, the Department issued a small book in Hindi named "Kisani Mala," containing selections from the first year's monthly issues of the *Hindi Agricultural Gazette.* This small book of 48 pages of print contains matter of permanent interest connected with the improvement of agriculture in these Provinces. The Department of Public Instruction has purchased 1,175 copies for distribution to village schools in eleven districts of the Provinces and indents are still being received. Eighty-eight copies have been sold to private individuals. A Marathi edition is now in the Press and will soon be ready. The Director of Public Instruction has already indented for 400 copies, and it is hoped that a large number will be purchased by private persons in the Marathi districts of the Provinces. The distribution of these publications has added considerably to the work of my office, and the strengthening of the establishment is a matter for urgent consideration.

The Department issued a Season and Crop Report containing the agricultural statistics of the province, the usual Crop Forecasts and the Trade Report.

The following leaflets were also issued:—

(1) Instructions for the preparation of lawns.

(2) Instructions for the cultivation of the potato (*Solanum Tuberosum*).

(3) Note on the cultivation of the Otaheite potato (*Dioscorea Sativa*).

(4) Note on the cultivation of the sweet potato (*Ipomœa Batatas*).

(5) Note on the cultivation of lucerne or alfalfa (*Medicago Sativa*).

(6) Note on the cultivation of juar in Chhattisgarh.

(7) Note on the cultivation of maize. (*Zea Mays*).

(8) Note on the cultivation of *sarson* (*Brassica compestres*) and *rai* (*Brassica Juncea*) as a second crop in house gardens.

(9) Note on the cultivation of *sorghum collier* as a fodder crop.

(10) Instructions for the destruction of grasshoppers in rice tracts according to the methods recommended by Mr. Stewart Stockman.

III.—Agricultural Enquiry and Experiment.

(*a*) *Experimental Farms.*

Nagpur Experimental Farm.

12. The annual report of the Nagpur and Telinkheri Experimental Farms was submitted with my letter No. 3840-7, dated the 18th August 1903. The most important feature of the year's work has been a revision of the programme of experimental cultivation, which has been made at the instance of the Inspector-General of Agriculture. The principal experiments in the past have been the trial of different manures upon rabi crops with and without irrigation. The experiments were conducted in plots scattered over the farm, but they have now been concentrated, with the result that it has been possible to enlarge their scope without any material change in the general scheme. The experiments to test the effect of phosphatic manures on different oil-seeds have been abandoned because they gave no useful results. Some most important experiments have now been started with kharif crops, the principal being to test the effects of different manures upon cotton and juar and of rotations. Nagpur is situated in the cotton-juar country, and these experiments should give useful information concerning these crops. It is intended in future that the investigation of problems connected with these two staples should be the main work of the farm. The investigation of problems connected with rabi crops will thus be relegated from the principal to a subordinate position. Nagpur is not a true rabi tract, and these problems can be better investigated in the more suitable land acquired for the new Experimental Farm at Hoshangabad.

Character of the season.

13. The year's rainfall was only 29·88 inches, which is about half the average, but in spite of this great deficiency the year was distinctly above the average, both for kharif and rabi crops. The short rainfall was very well distributed for agricultural requirements. Rice was somewhat damaged, whilst the tur (*cajanus indicus*) crop was destroyed by caterpillars, but other kharif crops, notably cotton and juar, gave excellent yields. All the rabi crops yielded outturns considerably above the average, thanks to good showers in December.

Experiments with manures.

14. The experiments with manures, with and without irrigation and with and without rotation of crops, generally confirm the results of previous years' experiments. Cattle-dung has again shown its superiority as a general manure. Saltpetre has also given good results, more particularly when applied as a top-dressing. There certainly seems a field for the profitable use of this manure, especially in conjunction with irrigation, so that any measures for cheapening its production should prove of benefit to the cultivator. Green manuring has been particularly successful.

Varieties of crops.

15. The scope of the farm work in testing different varieties of crops has been much enlarged. The most important experiments were made with cotton (93 varieties), juar (57 varieties) and wheat (153 varieties). These included varieties grown in the Central Provinces and in other parts of India, and also American, Egyptian and Sea Island cottons, and Australian wheats. The indigenous varieties generally gave much better results than the foreign exotics. The Egyptian cotton cannot be grown without irrigation, whilst the American cottons suffered considerably from the monsoon rainfall although it was exceptionally light. The "Jaunpur" variety of maize again proved its superiority over the best American varieties. Amongst the juars, the varieties known as "Ganeri," "Saoner" and "Halki" show most promise, whilst a Bombay variety known as "Dharwari," which is grown in the Dharwar District as a mixture with rice, seems likely to turn out a success in the districts of Chhattisgarh, where the rainfall is generally too heavy for other

varieties. The collection from districts of other crops has resulted in bringing to notice two which seem much better than those in ordinary cultivation—a large-seeded *chaoli* or *barbati* (*vigna catiang*) from Sambalpur, and a large-seeded tur (*cajanus indicus*) from Bilaspur. The careful testing of indigenous varietes of crops seems to be a field of work in which some successful results can be obtained.

Plant-breeding experiments.

16. Two important series of experiments were initiated under a definite scheme drawn up by the Inspector-General of Agriculture, the first being the raising of new varieties of cotton and the second being the raising of a rust-resistant wheat. The object of the first series is to raise improved hybrid cottons which will combine the hardiness and prolificness of the inferior local varieties with the fine lint of the best indigenous and some foreign varieties. This seems a much more hopeful scheme than that of acclimatizing foreign exotics.

Plant diseases.

17. I have mentioned above the important scheme started for the breeding of a rust-resistant wheat. There was some rust on the farm late in the season, which was successfully withstood by the hybrid of *haura* and *mundia pissi* raised in previous years. It would seem that each province must endeavour to work out its own salvation from wheat-rust, for a variety rust-resistant in one part is not, apparently, so in other parts of India. Another important investigation commenced at the farm by Dr. Butler, Cryptogamic Botanist, was that of a fungoid disease of *tur (cajanus indicus)*. This disease causes considerable damage on the farm, particularly in plots where *tur* has been grown for more than one year. I also believe that the disease is widely spread throughout the province, although cultivators often ascribe to cold and frost the death of plants attacked by the fungus. It is to be hoped that Dr. Butler's investigations will result in the discovery of some practical remedy. Trials were made of several fungicides for the eradication of smut, with the result that a solution of copper sulphate seems to be the cheapest effectual remedy.

General.

18. Ensilage was again made with successful results. The report contains some useful information concerning the trial of implements. The Swedish plough is gradually becoming known, a fair number having been sold. A turn-wrest plough by Cook and Sons gave excellent results, but its cost is too great to allow of its purchase by cultivators. A list of agricultural implements which were tested during the year is appended as annexture A to this report. The usefulness of the farm has been much increased by a large distribution of seeds. All the seed distributed was selected seed of new or improved varieties grown on the farm, the object being to introduce to the notice of cultivators something better than they can get elsewhere. No attempt was made to fill the function of an ordinary grain-lender.

Telinkheri Farm.

19. The condition of this farm is rapidly improving, much of the land having now been brought into a good state of tilth. A substantial profit is shown as the result of the year's working. Its main object is to raise seed of new and improved varieties of crops for distribution. The fuel and fodder reserves yield an abundant supply of grass, but the attempt to afforest the bare hills has not met with much success. Young trees will not live without artificial watering, which is most difficult to arrange.

The Sewage Farm.

20. The Sewage Farm shows a successful year's working. The cultivators obtained good crops and paid their rents without difficulty. The farm now yields a handsome profit, which should be an inducement to other municipalities to take up the question of the profitable disposal of their sewage.

Experimental Farms, Raipur and Hoshangabad.

21. The only experimental farm hitherto maintained has been the Nagpur Farm with its adjunct at Telinkheri. The Local Administration has been pleased to sanction the establishment of two additional farms, one at Raipur and one at Hoshangabad. The Nagpur Farm will now mainly concern itself with the problems connected with cotton and

juar cultivation; the Raipur Farm will be mainly devoted to rice; whilst the Hoshangabad Farm will be concerned with wheat and other rabi staples. The principal crops of the province will thus come under investigation at centres suited to their cultivation. A good deal of work has been caused by the preliminary arrangements for starting these farms. Great care has been taken in the selection of suitable sites, two good plots of land near the stations of Raipur and Hoshangabad having been chosen after inspection by the Inspector-General of Agriculture. The area acquired is 89·10 acres at Raipur and 127·25 acres at Hoshangabad. The past season has been occupied in getting some of the land into culturable condition, in embanking fields, digging irrigation wells, erecting farm buildings, and the like. My proposals for the farm establishments have been sanctioned, and cultivation has been started during the current season.

(*b*) *Other Agricultural Experiments and Enquiries.*

22. In last year's report, I gave an outline of the programme of agricultural work to be carried out in the districts of the Central Provinces, and in the present report I propose to state some of the results of the first year's working. Agricultural improvement is necessarily a plant of slow growth, which will require several years of careful tending before it can be expected to bear much fruit.

Introduction of juar and cotton cultivation in Chhattisgarh.

23. Five demonstration farms were taken up in Chhattisgarh (four in Bilaspur and one in Raipur) for the purpose of testing the possibilities of introducing juar and cotton, which should do well in years of scanty rainfall, when the predominant rice crop fails. Another subsidiary object is to improve the bad cattle of this tract by the growth of crops which will yield good cattle fodder. The cultivation was very well managed by the two Assistants in charge (Narhari Sitaram and Ratiram Khamparia). In Bilaspur the local cultivators took considerable interest in the farms, cheerfully supplied the necessary assistance and extended the trials to some of their own fields. When the farms were visited by me in September, the prospects looked very discouraging, the plants having suffered so considerably from water-logging in the heavy black soil that I was inclined to abandon further efforts. The outturns finally reported showed that considerable recovery was made in the later stages of growth. The local cultivators were most anxious that the experiments should be continued, and arrangements have been made to manage five demonstration farms during the current year. The sites have been more carefully selected in land which will not suffer so much from water-logging. There may be a fairly large quantity of land suited for these crops, consisting of undulating well-drained fields along the banks of streams; but I do not think that there is any hope that these crops will succeed in the level black-soil plains. The soil of the large farm at Khumari in the Raipur District was much more suitable, but several of the cultivators were careless and would not do the necessary tillage and watching of their crops. In spite of these drawbacks, the average outturn of juar was 635 lbs. per acre, the best cultivator getting as much as 1,653 lbs. per acre. This may be compared with the standard outturn of the Nagpur district, which is 600 lbs. of juar per acre. The outturn of cotton was also excellent, being an average of 634 lbs. per acre. The farm has produced some effect, for the villagers have this year sown some of their fields in accordance with the methods that they saw last year on this farm. Another effort in the same direction was made by the distribution of juar seed to selected cultivators. In this work, the Department received most valuable assistance from Mr. R. W. Johnson, Superintendent of the Raipur Public Garden. It would appear from the agricultural statistics that some slight measure of success has already been obtained, the area under juar and cotton having increased as follows:—

District.	Area under juar and its mixtures.		Area under cotton and its mixtures.	
	1901-02.	1902-03.	1901-02.	1902-03.
	Acres.	Acres.	Acres.	Acres.
Raipur	1,405	12,254	9,426	12,981
Bilaspur	1,505	1,054	5,721	5,969

The experiment is being continued during the current year, five demonstration farms having been started. In addition, juar seed to the large amount of 4,460 lbs. has been distributed to selected cultivators. A leaflet has been prepared, describing in simple language the best methods of cultivation, a copy of which is made over to each cultivator to whom seed is given.

Introduction of cotton cultivation in the Feudatory States of Nandgaon and Khairagarh.

24. In paragraph 24 of last year's report, I described the measures taken in these States to introduce cotton cultivation with correct methods by the working of four demonstration farms. The final accounts of these farms show a total expenditure of Rs. 1,986 and receipts of Rs. 2,236.

The working of these farms thus gave a profit, inclusive of the salaries of the overseers and all other expenses. The experiments achieved a considerable measure of success. The States are now undertaking themselves similar farms during the current year, and have induced a lot of cultivators to sow cotton.

Improvement of the method of cultivating kharif crops in the Hoshangabad District.

25. Five demonstration farms were started to induce cultivators to abandon their present methods of careless broadcast sowing and cultivation in favour of improved methods of sowing in lines with a seed drill and weeding with the bullock-hoe. The cultivation was successfully managed by Agricultural Assistant, Govind Raghoba, who took much pride in his work. The outturns were considerably better than those secured by cultivators with their local methods. At two centres the demonstrations have already produced some effect, the villagers having sown this season some of their fields in accordance with the improved methods. Five demonstration farms are again being worked during the current season.

Ensilage experiments.

26. Experiments in the preparation of ensilage were made at five centres, two in Bilaspur and three in Hoshangabad. The silos in Bilaspur consisted of a corner of the cowshed built up with mud walls, whilst in Hoshangabad the ordinary grain-pits (*banda*) were utilized. These silos were filled with juar and maize stalks and coarse grass. The silos were opened in February-March and found to contain excellent sour silage with very little wastage. Some of the material utilized in Hoshangabad was the noxious weed known as *kans* (*saccharum spontaneum*). The local cultivators were extremely pleased with these experiments, and I have some hopes that this method of preserving fodder will spread.

Fodder-cutting experiments.

27. A fodder-cutting machine (Messrs. Harder & Co.'s Ensilage Cutter and Shredder) was sent on tour in the Nagpur, Wardha, Nimar and Chanda Districts in order to demonstrate the advantage that results from chopping juar stalks into small pieces instead of feeding them whole to cattle. A considerable number of villages were visited. The demonstrations had most practical results in the Nagpur and Wardha Districts, where twenty-three machines in all have been ordered. The great drawback is that the machine is rather expensive, costing Rs. 215 landed at Nagpur. Attempts are now being made to obtain a cheaper machine which will do effectual work.

Introduction of *sorghum collier* as a fodder crop.

28. Experiments on the Nagpur Farm have shown that *sorghum collier* is an excellent fodder crop. Seed was distributed to selected cultivators in the Nagpur District, together with simple instructions as to the method of cultivation. The reports received of these trials are distinctly encouraging, a good crop of fodder being raised by most of the cultivators. The crop quickly comes to maturity, so that it is off the ground in time to allow of a second crop of gram in the land. It produces a heavy yield of very sweet stalks, much appreciated by the cattle. It is excellent material for ensilage.

Sugarcane cultivation. Improved methods of gur-making.

29. For some years past the area under sugarcane has been decreasing in these provinces. A special enquiry was, therefore, started to ascertain the causes of this decrease and to see if anything could be done to help the industry. This enquiry was commenced in the Bhandara and Sambalpur Districts. These

districts were visited by the Assistant Director, who took with him a complete set of sugarcane-crushing and gur-making apparatus obtained from Poona. The Poona three-roller iron mill is a much better type of crushing mill than the wooden mill in general use in these provinces. The shallow evaporating pan and furnace are also an improvement over the local types. Two expert gur-makers were brought from Poona to work the apparatus. Demonstrations were given at three centres in the Bhandara District and three centres in Sambalpur, the apparatus being set up and worked for a week at each centre. In each case *gur* was made by local methods alongside the Poona apparatus; these trials invariably resulted in an increase of about 10 per cent. in juice and 15 per cent. in *gur* in favour of the Poona apparatus. There is very little hope of introducing this apparatus into general use in Sambalpur, because the cattle are too small to work the mill, but in Bhandara renewed efforts may lead to some result. One small improvement which caught on in Bhandara was the Poona type of furnace, which requires no fuel in addition to the sugarcane trash. During the current season this demonstration will be made in the Betul and Chhindwara Districts.

The Meagher system of sewage disposal.

30. Demonstrations of the Meagher system of sewage disposal were made by an Agricultural Assistant at Chanda, Warora, Bhandara, Bilaspur, Raipur, Sehora, Murwara, Hoshangabad, Seoni-Malwa, Khandwa, Betul and Chhindwara. The results of these demonstrations have not been fully reported, but so far the information received is not very hopeful. Most of the municipalities seem to have done nothing after the departure of the Agricultural Assistant, and take no interest in the profitable disposal of the town sewage. The remarkable results achieved at Nagpur show what profit municipalities could derive from this system, if they would only give it a fair trial.

Insect pests – grasshoppers.

31. In paragraph 36 of last year's report, I gave an account of the investigation by Mr. S. Stockman into the local grasshopper pest. The result of his enquiry has been published in Agricultural Ledger No. 3 of 1903. The principal practical measure recommended by Mr. Stockman for the extermination of grasshoppers in rice tracts was the dragging of fields with nets or screens. This was tried last year on a considerable scale in the Bilaspur and Raipur Districts and met with some success. Arrangements have been made for a regular campaign during the current season, in which efforts will be made under careful supervision to clear entirely of grasshoppers a small tract of about 100 villages. In regard to the damage done to juar by grasshoppers, the practical remedies suggested are (1) the driving method, (2) the maintenance of a fallow, clean strip of land between all grass or jungle land and the cultivated fields, and (3) the rotation of crops. I am not so sanguine that the cultivators of juar will adopt these remedies so readily as the trawling method in rice fields. An abstract of the Ledger, giving an account of the practical remedies suggested, has been prepared in simple vernacular, which has been published in the *Hindi Agricultural Gazette* and also widely distributed in leaflets.

The eradication of smut in juar.

32. In paragraph 33 of last year's report I explained the plan adopted for introducing the method of eradicating smut in juar by pickling the seed in a solution of copper sulphate. Demonstrations on a considerable scale were made by the Revenue Inspectors of the Nagpur and Wardha Districts, who were specially trained in the method. Through the efforts of the Revenue Inspectors of the Nagpur District the seed sown in over 25,000 acres was pickled with sulphate of copper. The experiments were made in 1,421 villages in the fields of 8,650 cultivators, so that they have been widespread, The results attained in the Wardha District were not so good, the demonstrations being made in 437 villages in the fields of 1,327 cultivators over an area of 8,632 acres. These demonstrations have done much to bring the matter before cultivators; but last year smut was not so prevalent as usual, so that the object lesson was not very prominent. I have arranged that the demonstrations should be continued during the present season upon the same lines. In order to avoid the chance of erroneous treatment, all the Revenue Inspectors of both districts were summoned to head-

quarters, where the method was once more carefully explained to them by the Superintendent, Experimental Farm, Nagpur. As in the previous year, sulphate of copper to the value of Rs. 10 was given free to each Revenue Inspector, and some of them have in addition been given a stock for sale to cultivators. One obstacle to the general adoption of this method is the difficulty of obtaining good copper sulphate in villages. The experiment has been extended this year to the Chhindwara District, where some Revenue Inspectors have been similarly instructed by the Superintendent of the Experimental Farm, Nagpur. In order to encourage the Revenue Inspectors to take a real interest in pushing this scheme, prizes were awarded to those who showed the best results.

Rust in wheat.

33. The experimental trial of the hybrid wheat (*haura-mundia-pissi*) raised on the Nagpur Farm was continued in the districts of Saugor, Jubbulpore, Seoni, Narsinghpur and Hoshangabad. This wheat was sown side by side with local varieties in low-lying fields likely to be affected by rust. No rust appeared during the year, so that it was impossible to test its rust-resistant qualities. But all the districts, with the exception of Narsinghpur, have given a favourable opinion as to the excellence of this variety as a general wheat. It is somewhat earlier than those usually grown in the north of the Province, makes strong growth with much tillering, and gives a larger yield of grain with good milling qualities. It has particularly caught on in the Hoshangabad District, where a considerable quantity has already been grown.

The irrigation of rice from wells.

34. The experiments for the irrigation of rice from wells were conducted in the three districts of the Chhattisgarh Division. The main object was to test whether wells sunk below the bunds of tanks would hold water sufficient to give one or two late waterings to rice in order to save the crop in years of deficient late monsoon rainfall after the available water-supply in the tank had been exhausted. In the Bilaspur District four temporary wells were sunk below tank embankments to depths varying from 12 to 26 feet. Three of these wells failed to give any water at all, whilst in the fourth well a depth of 3 feet of water was obtained. This last well was 26 feet deep, but the supply of water was exhausted with one watering of the adjoining field, after which the well did not again fill. The experiments in this district were thus a complete failure. The wells were inspected by me in company with the Inspector-General of Agriculture. It was remarkable to find them quite dry even at the time that the tank held water, although they were dug at a lower level and close to the tank embankment. The only conclusion was that the beds of the tanks become water-tight from the deposit of silt that accumulates in them, whilst the wells did not reach the true sub-soil water level.

In Sambalpur 13 experimental wells were dug, varying in depth from 5 to 13 feet. Some water was obtained in all the wells, and a distinct connection could be traced between the height of water in the well and in the adjoining tank. It was found that each well could irrigate about one-tenth of an acre of rice *in a single day*, and that the water generally reached its old level during the night by fresh percolation from the tank. But as soon as the tank supply was exhausted, the water in the well generally dried up or was so small as to be insufficient for rice irrigation. The general conclusion arrived at after the inspection of the Inspector-General of Agriculture and myself was that there was little hope of the irrigation of rice from wells except in years of drought. The supply of water in the wells is too small to command much land, whilst it is closely dependant upon the supply in the adjoining tank and lasts but little longer. The cultivators already use a considerable number of wells for the irrigation of sugarcane, but these wells depend for their supply upon the sub-soil water and not upon percolation from the tank. The depth of sub-soil water is usually not great, but the cultivators will not admit that the water from similar wells can be profitably raised for the irrigation of rice. It was evident that well water would not be used in ordinary years, so the experiment will not be continued, but I still believe that, following the results of the experiments in Raipur, which are given below, there are possibilities of a considerable extension of irrigation from temporary wells in years of drought.

Experiments on a small scale similar to those described above were started in the Raipur District, but owing to the failure of the rains in September, these were rapidly expanded until they resulted in a trial upon a considerable scale. At first eight experimental wells were dug subsidiary to tanks. Four of these turned out very successfully, and when the failure of the monsoon in September foreshadowed a failure of the rice crop, efforts were made to extend the experiment upon a substantial scale. These enlarged operations were not started under favourable conditions, because it was too late to save much of the rice and because it was impossible to organize an efficient establishment and arrange a good plan of action at such short notice. The partial success of the operations was largely due to the energy of Mr. Blenkinsop, Settlement Officer. In all, 516 trial pits were sunk, of which 277 gave promise of success. These were converted into temporary wells, of which 230 were successful in securiug a supply of water sufficient for the irrigation of rice. Much apathy was shown by the cultivators in imitating these experiments even where they were successful, but 527 additional wells were so made by the cultivators themselves. A large number of the wells were not made subsidiary to tanks. In regard to the connection between the supply of water in wells sunk below tank embankments and the supply in the tank itself, the conclusion arrived at was that this depends on the nature of the soil. If the soil is not porous, it is useless to sink a well below the tank embankment, but if the soil is porous, such a well can be relied upon to give water for about a month after the tank has become dry. Most success was obtained from wells sunk at the foot of the highlying *bhata* ridges, into which a good supply of water percolates for about a month after the rainfall has ceased. Wells sunk in black soil were generally unsuccessful. Some of the trials showed that deep wells were not ordinarily more successful than shallow wells. The water-supply did not depend upon the true subsoil water-level but upon percolation from ridges for about a month after the cessation of rainfall. The average cost of digging a successful temporary well was Rs. 5-2-4. The extent to which these wells were utilized depended very largely upon the character of the cultivators. Some were too apathetic to use a good supply of water with a small lift of a few feet only. In other villages there was a certain amount of enthusiasm in the work. The average area irrigated per successful well was 1·11 acres. The best result from a single well was 9·94 acres. It was found that a large well with a small lift could irrigate about ½ an acre a day. The harvestings of some of the fields so irrigated showed that the extra produce averaged more than double the cost of construction and of irrigation. The result has been to prove that a considerable portion of the rice crop can be saved by irrigation from temporary wells in years when the monsoon ceases too early to bring it to maturity. It is an expedient which should be tried on a large scale in any future year of such deficient rainfall. It is necessary to start the preparations in good time, so that the staff can be organized and plans arranged before the crop has gone beyond the possibility of saving it.

Field embankments in Hoshangabad.

35. The rabi fields of Jubbulpore district are mostly embanked with the object of holding up water during the rains, which has the effect of destroying all weeds, improving the soil and giving a moist seed-bed in October. Experiments were started to test whether this system could be profitably followed lower down the Nerbudda Valley in the Hoshangabad District, where it is not at present practised. Schemes were prepared for embanking two suitable areas of land situated in mauzahs Powarkhera and Dhonkhera. The actual work could not start until the crops were reaped off the land in March, but work then steadily progressed under the supervision of the Deputy Commissioner. The schemes have now been completed, so that the bunded fields should be filled during the present monsoon and be ready for cultivation in the coming rabi season. A few years' cultivation should show whether the system of embanking land is suitable for Hoshangabad, and whether the people will take to it. Other experimental embankments are being made during the present season in other localities.

Crop-cutting experiments.

36. The number of crop-cutting experiments made during the year was 1,157 as against 938 in the previous year, 855 being made with kharif and 302 with rabi crops. More than one-third of these experiments were made in the Raipur and Bilaspur districts,

where the apprehension of famine made it necessary to enquire carefully into crop outturns. Of the total number of experiments, 497 were made by the Settlement Department, 47 by Deputy Commissioners, 87 by Assistant Commissioners, and 526 by Extra-Assistant Commissioners. A large number of experiments were made, for administrative purposes, by officers of inferior rank, but these have not been compiled in my office. The districts in which this branch of work was most neglected are Nimar, Seoni, Jubbulpore and Damoh. In last year's report I called attention to the importance of making a considerable number of experimental harvestings of cotton and til, the information about their outturn being meagre. This had not produced much result, and I again repeat this request. I have also issued separate instructions asking that experiments may be made with the cold-weather variety of juar known as *ringni*, information about its outturn being very meagre. At my request considerable attention has been given to ascertaining the outturns of each individual crop in fields sown with mixtures.

District Agricultural and Industrial Associations.

37. The Agricultural and Industrial Associations formed in each district for the development of its agricultural and industrial resources have generally made a good start. Most of them have arranged for two general meetings in the year, one to arrange the programme of work for the kharif season, and the other for the rabi season. Most of these meetings have been attended by the Assistant Director or Farm Superintendent, who have assisted the Association in framing a programme of practical work. A considerable quantity of seed of new or improved varieties of crops, likely to suit the district, has been distributed to the members, who will report the result of their trials. The Seoni Association appears to be one of the best, their programme of work including experiments in the selection of seed, the eradication of *kans*, the irrigation of wheat, the trial of the fly-shuttle loom and other matters. Wardha has had some good meetings, concerning itself with smut in juar, saltpetre as a manure for wheat, fodder-cutting machines, and the like. Chhindwara has framed a good programme dealing with the conservation of manure, smut in juar, ensilage and other practical matters. Raipur has made a good start with experiments in cotton and juar cultivation, and in tillage with the Swedish plough, six of which were bought. Sambalpur has mostly confined itself to the trials of new varieties of rice, one of which named "Halki" seems likely to become popular, being an early rice of better quality than any at present grown. These associations have done much towards bringing the department into touch with the leading agriculturists of the province. It is clear that their success will largely depend upon the amount of interest and encouragement they receive from the Deputy Commissioner of the district, who is the President. The Department has already received much assistance from non-official gentlemen, amongst whom I would mention Mr. Raghoba Ratiram, of Saoner, Nagpur; Rai Sahib Mathura Prasad, of Chhindwara; Seth Nathuram, of Saugor; Seth Narsingh Dass, of Chhindwara; Mr. Krishna Rao Deshmukh, of Wardha, and Mr. Kashinath Panda, of Sambalpur.

IV.—HORTICULTURE.

38. My annual report on the management of the Provincial, District and Court of Wards gardens was submitted with my letter No. 3343-25, dated the 21st July 1903. The Provincial Gardens (Maharajbagh and Telinkheri at Nagpur, and the Pachmarhi garden) were maintained in fairly good order. At the Maharajbagh new quarters for the Superintendent and an office were built, and a new fern-house was made. Trials were made of fifteen varieties of sweet potatoes, twelve indigenous and three American. The American varieties were, much the best, producing prolific crops of excellent tubers. Fifty-three baskets of cuttings were distributed to District Gardens and selected cultivators. The menagerie at the Maharajbagh was enriched by the gift of a tigress by the Rani of Nandgaon. A great improvement was made in the Telinkheri garden by the reconstruction of the Dancing Hall. The financial results of the year's working was unsatisfactory, partly owing to poor crops of fruit and vegetables due to the short rainfall and partly owing to careless management. The condition of the Pachmarhi Public Garden considerably improved under the management of a trained Garden Overseer. Improvements have been made

to the water-supply, but it is still inadequate. There are fifteen district gardens maintained by Government. Raipur and Mandla are again the only two gardens that have done much good by distributing plants and fruit trees. I hope that these gardens will assist in helping the institution of 'Arbor Day' by supplying young trees for the schools to plant out. The experiments with American sweet potatoes were not very successful, partly owing to careless cultivation and partly owing to the bad condition in which the cuttings were received. Now that each garden has got an established supply, I hope that they will do better next year and raise a number of cuttings for distribution to cultivators. The trial of the "Jaunpur" variety of maize was more successful. Some most useful work was done in the Raipur garden by testing several varieties of juar and by the distribution of seed of varieties that succeeded. The financial management of some district gardens is much neglected. In my review I have made some suggestions, which may lead to improvement if they are adopted.

V.—VETERINARY.

39. The office of Superintendent, Civil Veterinary Department, was held by Mr. J. S. Jethiji for eight months of the year only, as he was deputed under the Inspector-General, Civil Veterinary Department, for a course of training from June to October. The annual report prepared by Mr. Jethiji has been submitted with my letter No. 3305-119, dated the 18th July 1903, so that it is only necessary for me to notice a few of the more important features of the year's work.

Veterinary Dispensaries.

40. A new dispensary has been opened at Seoni, which increases the number to nine, whilst another has been opened at Damoh since the close of the year. This is slow progress considering the needs of the province. The scheme contemplates ultimately the maintenance by the District Council of a Veterinary Dispensary at each tahsil head-quarters, to which two Veterinary Assistants will be attached, one of whom should be constantly on tour in the tahsil. It is impossible, however, to develope this scheme because the District Councils have no funds to devote to this purpose. In the present condition of their finances a substantial contribution by Government to District Councils is required to allow more dispensaries to be opened. I have endeavoured to induce Municipal Committees to bear their share of the cost of dispensaries established in municipal towns, but this has not met with much success. There is often no lack of interest on the part of District Councils, who are quite willing to open dispensaries when funds are available, but there is a lack of sustained energy on the part of members in the management of dispensaries. The returns show arn apparent decrease in the number of animals treated during the year as compaed with the number treated last year, but this is really not the case, the present returns including new cases only. My own impression, gained during my tours and inspections of dispensaries, is that there has during the past year been a distinct increase in the local interest taken in these institutions due to the more active supervision of Government officers. Constant inspection by the Superintendent is required, for the Veterinary Assistants at present employed are not good enough men to manage dispensaries without regular supervision. The large field of veterinary work in the province will not, however, be properly reached until there is constant and systematic touring in the villages. This touring should of course be mainly directed to attendance at outbreaks of cattle disease, but in addition much can be done by ordinary tours to the large cattle markets and important villages. It is satisfactory to find that the instructions issued regarding the importance of systematic touring have borne some fruit, there having been an increase in the number of days spent on tour and the number of animals treated on tour. The amount of touring in most districts still much smaller than it should be, which is a matter that requires the consistant attention of the Superintendent.

Re-organization of staff.

41. It is yet too early to give a definite opinionupon the working of the re-organization scheme referredto in paragraph 44 of my report for the year 1901-02, but I incline to the opinion that the scale of pay is not sufficiently high to attract right stamp of man. I

have submitted proposals for a pension scheme, which will, if sanctioned, add considerably to the attractions of the Department. I have also received sanction to my proposal that candidates should in future receive a three years' course of training at the Lahore Veterinary College instead of a two years' course at the Ajmere Veterinary School. I have also submitted a scheme for the proper training of Veterinary Compounders and for regulating their pay under a graded scale. Hitherto each dispensary has been obliged to employ untrained men as Compounders and has experienced difficulty in getting suitable candidates. One change which should make touring less unpopular amongst Veterinary Assistants is that the fixed peripatetic allowance of Rs. 10 a month has been withdrawn and travelling allowance under the ordinary rules of the Civil Service Regulations substituted for it.

Prizes for cattle-breeding.

42. The scheme for the improvement of cattle-breeding by the award of substantial prizes at principal cattle fairs has now been tried for two years and has proved a failure. The principal cattle fairs of this province are filled either with bullocks for sale to agriculturists or with worn-out cattle for sale to the butcher, so that there is practically no competition for the Government of India prizes for bulls and cows. I do not think that the continuance of the system will lead to any practical result and in my opinion the grant could be spent to better advantage in the establishment of cattle-breeding farms and in supplying good breeding bulls.

Cattle-breeding Farm.

43. The Telenkheri Cattle-breeding Farm (Nagpur) has made an excellent start. Suitable sheds have been erected and the farm was stocked in November last with a herd of 34 cows, 12 calves and 1 bull. The present stock is 1 bull, 34 cows and 31 calves, which have considerably improved in condition. The cows and calves were all purchased from the famous Jaitpur herd of "Gaolao" cattle which is considered to be the best breed in the Nagpur country. The bull was purchased in the Arvi Tahsil of Wardha; he is the best that we could find, but has some defects. The great difficulty that was experienced in buying a good bull shows the necessity that there is for Government cattle farms. Since the close of the year the Hon'ble the Chief Commissioner has sanctioned the establishment of a second Cattle-breeding farm at Hoshangabad. It is proposed to stock this farm with a herd of cattle of the Malvi breed. Cattle of this breed, the home of which is in the Gwalior and Indore States, are largely imported into the northern districts as they are the best work cattle for the deep black soil. The object of these farms is to improve the agricultural cattle of the country by breeding good bulls from a herd of pure bred cattle. It will necessarily take some years before the farms can rear a large supply of good bulls fit for breeding purposes, but at the instance of the Inspector-General, Civil Veterinary Department, it is intended to enlarge the scope of the scheme by purchasing every year, if possible, a number of good young bull calves, which will be reared. By this means the output of good bulls should be considerably increased. A considerable initial expenditure must be incurred in fencing and additional buildings. I take this opportunity of giving the outlines of the method in which it is proposed to make use of these bulls. I do not think that there is any chance of success by keeping these bulls at fixed stands in charge of Government officials. It is proposed to hand them over under certain fixed conditions for short terms of a few years to landlords who take an interest in cattle-breeding. It will be necessary to lend sufficient bulls to supply the whole number of cows kept in the selected village. The conditions under which the bulls will be lent are as follows:—

(1) The landlord will be responsible for the proper feed and care of the Government bulls, which will be periodically inspected by the Veterinary Assistant and other Government officers.

(2) The landlord will be responsible for the immediate report of any illness of the bull and of the outbreak of any cattle disease in the village, but will not be responsible for any casualty which is not due to his neglect.

(3) No bull other than a Government bull, or one approved by the Civil Veterinary Department, must be kept in the village.

(4) All young stock, exceeding two years of age, must be castrated unless they are kept for rearing as bulls separately from the village herd.

It may be difficult to enforce strictly some of these conditions at the commencement, but I believe that the scheme will work successfully if care is taken to select suitable and reliable landlords to whom the Government bulls may be made over.

Cattle disease.

44. The more deadly cattle diseases, such as rinderpest, anthrax and the like, are widely prevalent in the Central Provinces. In two districts of the province, a system has been introduced for the registration of cattle deaths by village patwaris, but this has not been very successful. No attempt is made to register cattle deaths in other districts, but an annual enumeration is made. The losses to the province by cattle deaths are enormous, and this emphasizes the great importance of introducing inoculation methods of treatment. It is satisfactory to record that a start in this direction has now been made. All the Veterinary Assistants employed in the province are required to undergo a course of training in inoculation methods at the Bacteriological Laboratory. This has now been almost completed. Mr. Jethiji has also during the year under report inoculated cattle at one outbreak in the Jubbulpore District, where this treatment seems to have met with some success and to have been received without opposition by the people. In order to avoid the possibility of any error, which would make the system unpopular at its commencement, I have asked the Superintendent not to allow Veterinary Assistants to undertake inoculation work, until they have once done practical work at an outbreak under his direct supervision. It should soon be possible for Mr. Jethiji to satisfy himself whether the Veterinary Assistants have sufficient practical experience to justify him in allowing them to do this work alone without risk of a serious mishap.

Horse and mule breeding.

45. The results of the year's working have been as unsatisfactory as those of previous years. Four horse stallions and one donkey stallion were maintained by Government in the districts of Saugor, Damoh and Narsinghpur. The number of mares covered by the horse stallions was 92 as against 125 in the previous year; the donkey stallion covered 19 mares only. The results of the previous year's coverings by horse stallions are 30 foals, 65 not held and 30 not known. In last year's report I stated that I had directed the Superintendent, Civil Veterinary Department, to make a special enquiry into this branch of the work. His report was submitted with my letter No. 2210, dated the 26th May last, in which I have recommended the abolition of these operations. The efforts of past years have been quite unsuccessful; the country is unsuited for horse-breeding; the stock of mares kept by the people is of very inferior quality and quickly diminishing; there is no indigenous breed of horses; the people have no love of horse-breeding. For these reasons, it is useless for Government to continue their efforts to encourage horse-breeding.

Live-stock Return—Statement B.

46. The statistics show a substantial increase in the number of live-stock in the province. This increase is most marked in the Jubbulpore Division, whilst it is large in the Nerbudda Division, being probably due to the excellent seasons and returning agricultural prosperity. The Nagpur Division shows a decrease in the rice districts of Bhandara, Balaghat and Chanda, which may be due to the failure of the important rice crop and the insufficiency of fodder and water. The Chhattisgarh Division might be expected to show a decrease from the same cause, but there is an increase. In all Divisions there is a substantial increase in the number of plough-cattle, which is a satisfactory sign.

VI.—Co-operation with Enquiry under Imperial Control.

The Meteorological Department.

47. A report on the efficiency of the registration of rainfall was submitted to the Meteorological Reporter to the Government of India with my letter No. 2343, dated the 2nd June 1903. No new rain-gauge station was established, nor was any abolished during the year.

The number maintained was 86, of which 10 are observatories under the superintendence of the Meteorological Department. Of the remaining 76, which are under the superintendence of this Department, 9 are under the management of the Medical Department, 16 are maintained by Feudatory States, while the rest are in charge of either Kanungoes or Police Muharrirs. There were 18 cases against 20 in the previous year in which the weekly rainfall returns received from Deputy Commissioners and Feudatory States have been found incorrect. The number of inspections of rain-gauge stations during the year, of which reports were received in this office, is 106 against 94 in the preceding year, and 63 in the year 1900-01. The rain-gauge stations which were not inspected during the year are those at Bilaspur and Korba. The number of rain-gauges inspected by Tahsildars was 80 against 78 in the previous year. The Tahsildars in the Raipur District appear to have made some inspections, but the number has not been reported by the Deputy Commissioner. The defects generally found were faults in the fixing of the rain-gauges, disrepair of the railings, and interference by trees in the rainfall. It was found necessary in only one case to remove the gauge to a more suitable site. The general results attained during the year show a distinct improvement.

The Department of the Reporter on Economic Products. Edible gums.

48. The collection of Indian edible gums for the Reporter on Economic Products to the Government of India has now almost been completed. Botanical specimens of the gum, flower and fruit of the following species, received from the Jubbulpore, Mandla, Seoni, Betul, Bhandara and Sambalpur Districts, were sent to the Reporter :— (1) Acacia arabica, (2) Acacia lencophlæa, (3) Acacia catechu, (4) Anogeissus latifolia, (5) Boswellia thurifera, (6) Terminalia belerica, (7) Diospyros tomentosa, (8) Odina wodier, (9) Sterculia urens, (10) Buchanania latifolia, and (11) Terminalia tomentosa. Some of the samples sent were incomplete, and in order that the Indian Museum may have a complete herbarium specimen of each, I have asked the officers concerned to make good the deficiencies.

Investigation into the forms of Dioscorea (yams).

49. The investigation into the forms of dioscorea (yams) was continued during the year and specimens of different varieties, which were collected in the Damoh, Chanda and Nagpur Districts, were sent to the Reporter on Economic Products to the Government of India. Most of the specimens have been registered under their proper botanical names, but in some cases correct identification was not possible because the specimens sent were incomplete. These are being cultivated at the Royal Botanic Gardens in order that their identification may be authenticated. It is regrettable that the Deputy Commissioners of Saugor and Mandla have as yet not contributed specimens from their districts. The attention of these officers has been invited to the matter.

Lathyrus sativus.

50. The paralysis caused by the eating of the vetch known as teora or lakh (*lathyrus sativus*) has been the subject of a special investigation by Major Buchanan, I. M. S. This Department has assisted in the enquiry by collecting information concerning the different methods of cultivation and the different varieties. It would seem that there is no distinction botanically between the so-called different varieties, but there can be no doubt that there are two distinct agricultural crops grown in the province, namely, a large variety grown as a rabi crop in open fields, generally known as *teora* or *lakh*, and a small variety grown as a second crop in embanked rice plots, generally known as *lakhori*. An investigation has also been proceeding at the Imperial Institute with the object of separating the poisonous constituent. Samples of each variety of seed were collected from each district and sent to Major Buchanan and to the Reporter on Economic Products. One maund of the poisonous variety was obtained from the Saugor district for experiments in the Imperial Institute, and 25 maunds of the same grain were supplied to Major Buchanan for feeding experiments.

Other collections.

51. The Reporter was also supplied with—

(1) The seed and pods of two varieties of chillies (*capsicum*), locally know as *dholri* and *diwani* together with information concerning the methods of cultivation.

(2) Botanical specimens of three varieties of pan (*piper betle*) collected in the Nagpur district, with information concerning the methods of cultivation.

(4) The fruits and gum of *bassia latifolia*—mahua—collected in the Jubbulpore district, and

(4) Samples of stones collected in the Sambalpur district. On examination the stones have proved to be forms of jasper, with the one exception of a mica schist.

During the year under report samples of different varieties of food-grains were obtained from each district of the Provinces. These will be grown on the Experimental Farm at Nagpur and botanical specimens of the flowers, fruits, seeds, &c., of every variety of every crop cultivated will be supplied to the Reporter for the Indian Museum, Calcutta.

The Department of Agricultural Chemistry.

52. The Agricultural Chemist to the Government of India has asked for assistance in the collection of samples for an enquiry into the value of the ordinary cattle foods of India, such as oil-cake, cotton seed, the straw, husks, leaves and pods (*bhusa*) of cereals and pulses, and the like. A large number of samples has been sent from the districts of the Central Provinces, and the results of the analyses are awaited with interest.

VII.—Museums.

53. The Provincial Museum at Nagpur and the local one at Raipur are the only institutions of this class in the Province.

The daily average number of visitors to the Nagpur Museum was 283 as against 358 in the previous year, the decrease being apparently due to the prevalence of bubonic plague. Some important additions were made during the year, notably a collection of horn work from Ratnagiri in the Bombay Presidency, a collection of jewellery from Chanda and of leather and cotton prints from the same district. The jewellery, leather and cotton prints are duplicates of the specimens ordered for the Delhi Arts Exhibition. To the coin cabinet 36 additions were made, which were principally gifts by the Government of the United Provinces of Agra and Oudh. The Museum is now in better order than it was last year. Some useless exhibits have been removed and additional cases have been prepared in which exhibits can be kept in good order, and yet suitably displayed. Much still remains to be done, more particularly in the classification and arrangement of exhibits. The number of visitors to the Museum at Raipur shows a large increase from 102,874 to 134,254. The principal additions to the Museum consist of some brass utensils of local manufacture from Bilaspur. This is the first step towards making a collection of local manufactures of the Chhattisgarh Division. Local officers could, if they like, assist materially in making this collection. The District Council has increased its annual contribution from Rs. 400 to Rs. 500, and I trust that the Municipal Committee will soon see its way to make a similar increase in its present small contribution of Rs. 150. With better financial resources Mr. H. S. Gour, Honorary Curator, would be able to make many improvements in the Museum.

VIII.—General.

The Tassar-silk Industry.

54. In paragraph 59 of last year's report I referred to the enquiry into the rearing of tassar-silk worms—an industry which has much decreased during recent years. The orders at that time contemplated the founding of ryotwari villages expressly with the object of encouraging tassar rearing in conjunction with the cultivation of field crops. This proposal has now been abandoned in favour of the plan of setting aside suitable areas in Government forests situated near well-established villages where tassar

rearers reside. Formal disforestment will be held over until such time as the success of the industry is more assured than it is at present, and the areas set apart are merely to be handed over to the management of the Revenue Department, by whom they will be leased for short terms of years to tassar rearers at merely nominal rents. Facilities will be given to the tassar rearers to procure fresh stocks of cocoons from Government forest; the healthiness of the stock seems to depend considerably upon its renewal from wild cocoons. The feasibility of stimulating the industry by introducing improved methods of reeling, spinning, and other allied processes, has also been considered. The industry is at present undoubtedly suffering from short supply of cocoons and not from lack of demand for the cloth, so that until we have solved the problem of increasing the outturn of cocoons, any action tending to cheapen production or stimulate demand can have but little effect. It is in the direction of reeling that there seems to be most room for improvement. The native methods of reeling are of the most primitive description; but attempts in other parts of India to introduce Italian or French reeling machines do not seem to have met with any success. References to the Reporter on Economic Products and the Director of Agriculture, Bengal, have failed to elicit any information concerning improved methods of reeling. As regards spinning, the Chanda machine seems superior to that used in Chhattisgarh. I have asked Mr. Dewar, the author of the Monograph on Silk, who is now Settlement Officer, Sambalpur, to show the Chanda machine to the Sambalpur spinners and to see if it can be profitably introduced. An attempt is being made to improve the patterns of tassar cloth made in the Chanda district. Patterns of the more artistic Sambalpur cloth have been sent to Chanda and an expert Sambalpur weaver has been sent there to explain the method of weaving the elaborate coloured borders of it. I may add that finding the Central Provinces tassar industries were very imperfectly represented both at the Indian and Nagpur Museums, I have entrusted Mr. Dewar with the collection of two complete and representative sets of samples from all districts, one of which will be forwarded to the Calcutta Museum and the other deposited in the Nagpur Museum. This should tend to stimulate the interest of visitors in the industry.

The Hand-weaving Industry.

55. A fly-shuttle hand-loom was procured from the Madras School of Arts to test the possibility of introducing it amongst the hand weavers. The local weavers condemned the loom, and it was with difficulty that I induced one of them to work it. The Manager of the Empress Mills was good enough to lend me the services of a thoroughly skilled weaver, with intelligence far above his class, who has himself made a fly-shuttle hand-loom from the ideas learnt by him from working with power-looms. This weaver turned out fairly quick work with the Madras loom, but he did not approve of it. The loom was afterwards tried in the Nagpur Jail, but there also failed to give satisfaction. There seems no prospect of bringing this loom into general use. It is expensive; it is too large to go into a weaver's ordinary house; the weaver has to sit in a position to which he is not accustomed; the mechanism is too intricate. If the fly-shuttle is to be introduced into the Central Provinces, the most likely method is to graft it on to the ordinary native loom with such other small improvements as seem possible. Experiments on these lines are reported to have been successful at the Jubbulpore Reformatory School. I have recently seen a fly-shuttle attachment, designed by the Empress Mills weaver mentioned above, which seems to give some hope of success. The feature, which is novel to me, is that the fly-shuttle is worked by the feet from the treadles, thus leaving the hands free to look after the slay and threads. The mechanism can easily be attached to any ordinary hand-loom and is inexpensive.

Bassia latifolia.

56. During my tours I have been much struck by the general absence of all reproduction of mahua (*Bassia latifolia*) trees in village areas. It is quite the exception to see a young tree, whilst many fine old trees have been killed by the drought of 1899. The villagers seem to plant out no young mahua seedlings, whilst except in forest areas the tree is allowed no chance to reproduce itself naturally. With this absence of all natural and artificial reproduction it seems only a question of time for many villages to lose a most valuable addition to their food-supplies. The mahua

flourishes on light sandy or laterite soil, which is not capable of growing crops, and its presence can interfere but little with the scanty fodder grass produced on such lands. One of the most profitable uses for such land seems to be to plant mahua trees. I have commended this matter to the attention of all Deputy Commissioners and have suggested that every encouragement should be given to the planting of mahua trees in waste land suitable to their growth. If a continuous effort is made by the District Revenue staff and by the District Council and Local Board members, it may result in the planting out of a considerable number of mahua trees. Assistance might also be given by the raising of seedlings in public gardens and District Council nurseries for free distribution to cultivators. I am glad to mention that this suggestion has already been acted upon in some districts, notably in Saugor.

Conclusion.

57. A good start has been made by the small establishment employed, and the work of the Department has gained much popularity during the past year. In most parts of the provinces leading malguzars and landowners have taken much interest in it. There is reason to hope that good will result from the practical demonstrations which have been the essential part of the work of the small establishment employed. The Department is still in its infancy and there are many difficulties to combat before much growth can be expected. The task is one which requires much energy, patience and perseverance. Mr. R. S. Johsi, the Assistant Director, has done his utmost to overcome the many difficulties that have arisen in his new and enlarged sphere of duty, and has readily responded to the great demands that I have been obliged to make upon him.

My thanks are also due to Mr. J. W. Mollison, Inspector-General of Agriculture in India, for his valuable advice and assistance, which has always been most freely given.

I have the honour to be,

Sir,

Your most obedient Servant,

F. G. SLY,

Commissioner of Settlements and Agriculture.

Secretariat Press, Nagpur :—T. P. R., 25-8-1903—600.

LIST OF APPENDICES.

STATEMENT A.—List of Agricultural Implements which have been tested in the Central Provinces.

B.—Showing the number of Agricultural Stock in each district of the Central Provinces.

A.

List of Agricultural Implements which have been tested in the Central Provinces during the year ending 31st March 1903.

[Those which have met with marked success are shown in Italics in Column 2.]

No.	Name.	Use.	Special advantages.	Price.	Where procurable.	Opinion of Official Reporter.	Extent to which used by native agriculturists.
1	2	3	4	5	6	7	8
				Rs. a. p.			
1	*Swedish Plough* ...	Ploughing and inverting the soil.	Efficiency in ploughing and inverting the soil, especially in breaking up grass lands.	16 0 0	Ankerbank's Red Shop and Company, O'sverums, Sweden.	A most useful plough for black soil. Has continued to do very good work on the Nagpur Farm.	A considerable number has been sold by the Nagpur Farm.
2	*Mayfurth's Hand Thresher.*	Threshing any crop except juar.	Cheapness and rapidity in threshing crops.	127 6 0	Mayfurth and Company of Frankfort-on-Maine, Germany.	A useful instrument ...	Has not been taken up by native cultivators.
3	*Macarthy Hand Cotton Gin.*	Ginning cotton ...	Rapidity in ginning, and saving of labour.	220 0 0	Messrs. N. D. Maxwell and Company, Bombay.	An excellent small gin which works satisfactorily and does not injure the seed.	Do. do.
4	*Poona 3-roller Iron Sugar Mill.*	Sugarcane crushing ...	A copy in iron of the ordinary wooden mill, which is easily worked and very efficient.	160 0 0	Superintendent, Experimental Farm, Poona.	Simple in construction and strong. Strongly recommended.	
5	*Poona Evaporating Sugarpan.*	Preparing gur from sugarcane juice.	A shallow pan of improved shape.	30 8 0	Do. do. ...	Strong. Highly recommended.	
6	*Fanning-mill* ...	Winnowing all varieties of grain.	Easily worked by hand; gives large outturn and separates grain from husk and dirt.	136 0 0	Harder and Company, Empire Agricultural Works, Cobleskill, New York.	The best winnower yet tried ...	Native cultivators are commencing to ask for this machine, which allows them to winnow grain without waiting for a breeze.
7	Marwin-Smith's round-about gear two-bullock power.	Working all kinds of agricultural machinery.	A useful power machine easily worked with bullocks.	210 0 0	Messrs. Marvin Simith and Company, United States, America.	Recommended ...	A few have already been sold.
8	Marvin-Smith's four-horse power round-about bullock gear.	Do. do. ...	A more powerful machine.	320 0 0	Do. do. ...	.....	Two have been ordered in the Nagpur and one in the Chhindwara District.

9	Bucket Pump ...	Spraying fruit trees with insecticides and fungicides.	A fairly efficient spraying machine	10 0 0	America ...	Works well.	.....
10	Perfection Sprayer ...	Spraying small plants.	A very cheap sprayer.	2 8 0	Do. ...	Works satisfactorily.	.....
11	Granger seeder ...	Broadcast sowing of seed.	Sow seed broadcast over a large stretch of land.	10 0 0	.....	Requires practice to work evenly.	.....
12	*Fodder Cutter and Shredder.*	Cutting juar stalks into short pieces.	Rapidity in cutting juar stalks (*karbi*) into small lengths the whole of which cattle are able to consume.	215 0 0	Harder and Company, Empire Agricultural Works, Cobleskill, New York.	A very useful implement for cutting juar stalks into quarter-inch bits, which cattle eat with great ease. It effects a great saving in fodder as nothing is wasted, It cuts very fast, and is easy to work. A man working at the machine for half a day can produce chopped food for 30 head of cattle. It is also a very good machine for chopping maize stalks. A very sweet silage can then be prepared out of this material that would otherwise be wasted.	A considerable number have been sold at the Nagpur Farm.
13	Hand Fodder Chopper..	Do. ...	Do. ...	12 0 0	Messrs. Marvin-Smith and Company, America.	A useful hand implement for a small cultivator.	A demand has already arisen.
14	*Cook's Turnwrest Plough.*	Ploughing and inverting the soil.	Has the special advantage of working along the furrow in both directions.	72 0 0	Cook and Sons, England ...	A very strong plough which gives work equal to the Swedish Plough No. 1, and has the additional advantage of working along the furrow in both directions. It gave excellent results in breaking up waste land, but its price is too high for native cultivators.	
15	Kent's Corn Planter ...	Sowing maize ...	.....	5 0 0	Messrs. Marvin-Smith and Company, United States of America.	Works fairly well.	
16	Mathew's Combination Drill double-wheel with hoe.	.....	.....	35 0 0		A useful implement for sowing and weeding kharif crops, but is more suitable for garden than field work.	
17	*Cornsheller* ...	Shelling maize ...	.....	10 0 0		A useful little instrument that saves much labour.	

STATEMENT B.—Showing the number of Agricultural Stock in each District of the Central Provinces during the Agricultural year ending the 31st May 1903.

	Districts.	Bulls and bullocks.	Cows.	Male buffaloes.	Cow buffaloes.	Young stock (calves and buffaloe calves.)	Sheep.	Goats.	Horses and ponies.	Mules and Donkeys.		Camels.	Total of cols. 1 to 10.	Plough cattle (included in columns 1—5).	Ploughs.	Carts.
										Mules.	Donkeys.					
		1	2	3	4	5	6	7	8	9		10	11	12	13	14
		No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Jubbulpore Division.	Saugor ...	119,521	131,744	3,088	61,576	155,859	15,414	19,517	7,975	425	1270	10	516,399	95,979	45,198	13,900
	Damoh ...	100,558	87,767	3,301	35,480	89,432	13,373	24,620	4,349	14	1,863	4	360,761	316,538	44,670	5,380
	Jubbulpore ...	182,392	123,092	9,769	45,634	150,422	14,083	33,818	10,486	171	431	14	570,312	169,533	60.312	4,972
	Mandla ...	109,768	158,286	7,419	23,958	48,813	1,620	8,849	4,455	3	18	,,	363,189	81,726	39,468	1,471
	Seoni ...	112,832	101,651	11,983	26,348	59,362	1,412	17,326	4,922	12	177	24	335,549	48,701	39,301	14,008
	Total Jubbulpore Division ...	624,571	602,540	35,560	197,996	503,888	45,902	104,130	32,187	625	3,759	52	2,151,210	712,477	228,949	39,731
Nerbudda Division.	Narsinghpur	71,669	51,593	3,112	22,196	83,122	7,284	25,981	6,379	56	4,027	8	275,427	61,776	27,538	12,808
	Hoshangabad ...	104,730	75,545	3,579	31,414	102,096	6.559	26,275	3,682	78	1,713	74	355,745	92,864	32,394	26,752
	Nimar	98,654	67,074	2,616	31,275	58,396	1,634	32,399	2,104	7	1,423	,,	295,582	258,015	32,235	23,224
	Betul ...	112,495	58,276	2,644	15,993	73,888	3,803	30,067	5,290	,,	364	6	302,326	92,383	33,553	14,345
	Chhindwara ... Khalsa...	124,782	95,366	3,803	24,019	88,377	5,502	46,731	6,966	1	730	11	396,288	117,615	39,633	21,189
	Chhindwara ... Jagirs ...	17,942	21,366	754	4,323	23,716	756	2,741	1,257	1	25	4	72,885	14,124	7,735	487
	Total Nerbudda Division ...	530,272	369,220	16,508	129,220	429,595	25,038	164,194	25,678	143	8,282	103	1,698,253	636,777	173,088	98,805

Nagpur Division.	Wardha		...	124,930	77,410	3,741	25,996	57,447	14,866	70,392	2,532	4	2,788	3	380,109	182,377	19,980	28,832
	Nagpur		...	215,328	134,219	6,105	32,643	92,042	43,216	112,660	4,215	41	1,503	21	641,993	307,370	48,152	38,661
	Chanda	Khalsa	...	143,398	154,038	11,240	31,632	78,410	57,523	77,612	1.806	5	92	...	555,756	129,624	87,093	23,993
		Zamindari	...	32,722	47,017	6,854	5,627	38,405	469	12,407	254	...	...	...	143,755	30,625	14,235	7 209
	Bhandara	Khalsa	...	107,755	74,159	1,823	15,596	63,533	6,303	56,233	1,457	1	156	...	327,106	171,288	46,217	32,132
		Zamindari	...	59,240	34,248	512	3,614	16,342	143	18,012	621	...	7	...	132,739	75,582	21,776	13,124
	Balaghat	Khalsa	...	60,310	61,092	13,918	6,245	30,961	266	15,055	553	...	4	...	188,404	64,170	31,665	20,764
		Zamindari	...	18,056	14,583	3,725	1,869	10,625	120	5,205	339	...	...	...	54,472	19,020	8,696	4,734
	Total Nagpur Division		...	761,739	596,716	47,918	123,222	387,765	122,996	367,576	11,777	51	4,550	24	2,424,334	980,056	277,864	175,449
Chhattisgarh Division.	Raipur	Khalsa	...	379,042	259,619	71,584	25,730	206,651	46,304	55,702	7,837	4	23	...	1,052,496	410,123	155,575	45,325
		Zamindari	...	91,670	96,304	13,868	10,219	71,118	9,260	16,850	1,494	...	55	...	310,838	94,446	34,665	9,137
	Bilaspur	Khalsa	...	199,848	196,395	45,683	17,484	154,645	16,862	37,263	6,736	...	8	...	674,924	245,531	73,072	17,239
		Zamindari	..	88,703	99,773	17,927	7,203	66,263	1,209	25,213	2,541	...	3	1	308,896	106,630	34,965	10,234
	Sambalpur	Khalsa	...	136,687	57,835	20,579	4,270	59,135	7,871	15,525	1,321	...	36	1	303,263	150,854	72,470	7,796
		Zamindari	...	101,722	77,953	20,060	6,717	86,491	6,122	26,632	1,175	...	...	...	326,872	115,957	55,529	11,385
	Total Chhattisgarh Division		...	997,672	787,879	189,701	71,623	644,303	87,683	177,185	21,107	4	125	2	2,977,289	1,123,541	426,276	101,117
	PROVINCIAL TOTAL		...	2,914,254	2,356,355	289,687	522,061	1,965,551	281,624	813,085	90,749	823	16,716	181	9,251,086	3,452,851	1,106,177	415,102

Secretariat Press, Nagpur.—R. D., 27-8-1903—600.

REPORT

ON THE

DEPARTMENT OF AGRICULTURE,

CENTRAL PROVINCES,

FOR THE YEAR

1903-04.

133953

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Extract from the Proceedings of the Hon'ble the Chief Commissioner, Central Provinces, in the Revenue Department, No. 7095, *dated the* 11*th November* 1904.

READ—

Report on the Department of Agriculture, Central Provinces, for the year ending the 31st March 1904.

READ ALSO

Report on the working of the Experimental Farms for the same year, and letter No. 4825-1—7, dated the 17th September 1904, from the Commissioner of Settlements and Agriculture, Central Provinces, forwarding the same.

Report on the working of the Provincial, District and Court of Wards Gardens for the same year, and letter No. 4267-25, dated the 20th August 1904, from the Commissioner of Settlements and Agriculture, forwarding the same.

Report on the working of the Civil Veterinary Department for the same year, and also letter No. 4380-119, dated the 26th August 1904, from the Commissioner of Settlements and Agriculture, Central Provinces, forwarding the same.

RESOLUTION.

During the year the control of the Department of Agriculture, Berar, was transferred to the Director of Agriculture in the Central Provinces. The present review deals not only with the Report of the Department of Agriculture for the combined provinces, but also with the other reports mentioned in the preamble with which it is connected. The report was due in print in the Secretariat on the 1st August 1904, but a final copy was not received till the 27th October 1904. The delay is ascribed to the pressure of work in the office of the Director of Agriculture. The Officiating Chief Commissioner recognizes the increasing difficulty which results from the posts of Commissioner of Settlements and Director of Agriculture being held by a single officer. Work has increased immensely in volume particularly in the administration of the Department of Agriculture, and with the addition of Berar the need for some redistribution of the work under the control of the Commissioner of Settlements and Agriculture is rapidly becoming apparent.

2. The report gives evidence of steady progress and development in the Department, of which Mr. Sly held charge almost up to the close of the year. Proposals, which are at present under consideration, have recently been received for strengthening the staff of the Department. Signs are apparent of an increasing demand for trained agriculturists, especially for management of Court of Wards estates, and the necessity for having men with an agricultural training for employment in the Land Revenue and Agriculture Departments is yearly becoming greater. The remarks of the Director as to the need for improvement in the Agricultural School are of importance in this connection. With the organization of the Victoria Memorial Institute, which is now approaching completion, it is hoped that a stimulus will be given to agricultural education in Nagpur; but the Officiating Chief Commissioner desires that the causes mentioned by Mr. Standen in paragraph 6 of his Report as contributing to the present faulty system may receive his careful attention. It is clear that progress cannot be satisfactory unless the youths who seek admission to the school possess sufficient education to assimilate the teaching they receive, and unless new comers are entered at the beginning of the course.

3. The Normal School classes were well attended, and Mr. Lely notes with satisfaction that some of the masters who have been through this class have done practical work at their schools. The passed masters might be of

valuable assistance in introducing new garden crops and new varieties of field crops to the notice of cultivators. The malguzari class, intended to give practical training to the sons of malguzars and cultivators, is still in its infancy. Mr. Lely would invite the attention of District Officers to the desirability of obtaining suitable pupils for the class.

4. The circulation of the *Agricultural Gazette* among private subscribers has risen from 1,823 to 2,035 copies during the year, and a Marathi edition of the journal has now been issued for circulation in the Nagpur country and Berar. The recently formed District Agricultural and Industrial Associations have in several cases done a certain amount of useful work, and the Officiating Chief Commissioner would commend to their notice the remarks which Mr. Standen has made in paragraph 26 of the Report for their guidance. In particular he would point out that if ultimate success is to be obtained, the Associations should be content with small beginnings of an eminently practical nature, and that special attention should be paid to the distribution of good seed and to the cultivation of new and promising varieties.

5. The new experimental farms near Raipur and Hoshangabad were established during the year under report, but little could be done before the sowing season beyond clearing and preparing the land for experimental purposes. In the current year work has been started in accordance with a programme drawn up in consultation with the Inspector-General of Agriculture. At the Nagpur Farm the extension and improvement of the irrigation work which provides the farm and the Maharaj Bagh and Telinkheri Gardens with water was taken in hand.

6. Among the experiments conducted at the Nagpur Farm some of those for testing the effect of different manures on wheat are likely to yield results in the near future. Experiments with the object of producing rust-resisting wheat and improved hybrid cottons were continued during the year, and the results attained in the case of cotton were distinctly encouraging. Acclimatized Upland Georgian cotton seed was distributed for the first time to cultivators. In accordance with recent proposals of the Government of India special measures are about to be taken at different centres for the selection and distribution of good cotton seed of local growth, and the Director of Agriculture has suggested steps for the encouragement of private seed farms which have been approved of by the Officiating Chief Commissioner.

7. The demonstration of cotton and juar cultivation was continued during the year in the Raipur and Bilaspur Districts with the object of obtaining an alternative crop to rice, which is the staple of Chhattisgarh, and of procuring a better supply of fodder for cattle. The year was one of heavy rainfall and was unfavourable to these crops, and general failure was the result, which also illustrated the danger of pressing experiment without thorough expert guidance. The Director is not sanguine that these crops are ever likely to be a success in the level stretches of black soil in Chhattisgarh, but if grown in suitable localities and if their cultivation is properly supervised, both cotton and juar might be grown with profit over considerable areas. The demonstration plots started in Hoshangabad clearly showed that the methods of cultivating cotton and juar in force in the Nagpur country were superior to the local custom of broadcast sowing. Experiments were made in ensilage with fair success in three districts, and Mr. Standen thinks that a considerable extension of ensilage is probable, particularly in Berar.

8. The demand for agricultural implements continues to grow, and their sale is becoming an important part of the Department's work. Since the close of the year a proposal has been sanctioned for the formation of a central depôt for stocking agricultural implements for sale to the public, on the understanding that only such implements are to be stocked as are simple and inexpensive and have been actually found suitable to Indian needs. One of the implements tried at the Nagpur Farm is a cheap fodder-cutter, which is likely to find a ready market in the Nagpur country and Berar. With the extension of cotton, the price of juar fodder has risen largely, and the economy effected by cutting up the stalks

will appeal to cattle-owners if a handy and inexpensive machine is put within their reach. Municipal Committees still continue to show an attitude of indifference towards the Meagher system of sewage disposal, and it is proposed to extend the method of demonstration so as to cover the whole of the operations up to the hoeing of the crop instead of merely preparing the land. The Officiating Chief Commissioner desires that the effect of this measure be tried; it is of great importance to do everything possible to overcome the prejudice which exists against the employment of this useful system. A campaign against grasshoppers in the rice lands of Chhattisgarh had again to be undertaken during the year, and the thanks of the Administration are due to the officers whose services have been brought to notice in the report as having led to the success of the operations. The experiments in embanking rabi land in Hoshangabad were continued on a considerable scale, but the present year's rainfall has been insufficient to flood the fields, and the result of the work cannot be ascertained for another year.

9. The number of crop-cutting experiments decreased by over 200 in the Central Provinces and the results of only 56 were reported from Berar. The number of crop experiments made in the latter province has hitherto been limited, but orders have issued directing that the practice should be extended. Mr. Standen has remarked on the reporting of the results of experiments being sometimes of an unsatisfactory nature. If the experiments are to be of real use, it is incumbent that they should be conducted by competent officers, and the rule that no one below the rank of Extra-Assistant Commissioner should ordinarily be allowed to make them should be strictly observed.

10. The Provincial gardens at Nagpur suffered on account of changes in the supervising staff. The Superintendent of the Maharaj Bagh had to be dismissed on account of irregularities in the accounts, and two Overseers appointed to the Telinkheri gardens left after a short stay. A new Superintendent has now been obtained for the Maharaj Bagh, and it is intended to make use of his services for the improvement of existing varieties of fruit and vegetables, and the experimental cultivation of new plants likely to be of economic value. The Pachmarhi gardens have been greatly improved; a sufficient supply of water has been secured, the gardens are well looked after, and receipts have risen by over 50 per cent. The number of district gardens under Government management fell from 15 to 14 owing to the abandonment of the Chanda garden. The year was generally favourable for garden crops, and the percentage of receipts to expenditure rose from 42 to 46. The subject of distributing fruit trees and other plants has received increased attention, and the number of plants sold or given away has been more than doubled, but for this result the gardens at Saugor and Raipur are chiefly responsible, more than half the total distributions being credited to these two gardens alone. As an example of successful management the Raipur garden is again quoted in the report, and the thanks of the Administration are due to Mr. R. W. Johnson, the late Superintendent, for the work he has done, especially in connection with experiments in introducing the cultivation of juar in Chhattisgarh.

11. Mr. Lely is strongly of opinion that experimental farms are worse than useless unless assured of thoroughly scientific direction. Without the latter they are certain to end in mistakes which discredit the teaching of Government in the eyes of the skilled cultivator. The function of the district garden is different. It is to show to the local public what can be done in the way of fruit, vegetables and flowers by an ordinary gardener with ordinary methods under intelligent supervision. There is in most stations some one who can supply the latter without being prepared to go farther. It is clear that much good may be done, but, on the other hand, much money wasted in this way, and it would be a step in the right direction if a fixed grant were allotted to each garden according to its annual requirements, and if expenditure were strictly limited to what could be undertaken with the sum so allotted.

12. In accordance with the orders contained in letter No. 144—412-2, from the Government of India in the Department of Revenue and Agriculture, the report of the Superintendent of the Civil Veterinary Department is for the first

time added as an appendix to the present Report. Some of the tables have been compiled separately for the two provinces : this will in future be avoided. Mr. Jethiji, M. R. C. V. S., held charge of the Department throughout the year ; he has taken a keen interest in his work, and under him the Department has begun to make progress. Three new dispensaries were opened in the Central Provinces and five in Berar, making a total of 29 for the combined province. In Berar a dispensary has now been established in all the taluqs except one, but the Central Provinces is still badly supplied and three districts remain entirely unequipped. The reason of this difference is the much sounder condition of the Local Funds in the former province. The Government of India have recently addressed this Administration regarding the development and expansion of the subordinate veterinary service, and proposals for the entertainment of two Veterinary Inspectors for the Central Provinces have been sanctioned. Approval has also been given to a pension scheme for Veterinary Assistants, and this should result in making the service more attractive and in getting rid of the difficulty of obtaining competent men for the Department. The most pressing need is the opening of new dispensaries. Many of the District Councils are hampered for want of funds, and Mr. Standen points out that Municipalities in many cases do not contribute according to their means to the institutions at head-quarters. Mr. Lely sees no reason why the latter should not be called upon to contribute substantial support to dispensaries at which the animals treated come chiefly from within municipal limits, and the Director has been asked to furnish a report upon this subject with a view to the matter being brought prominently to the notice of Municipal Committees.

13. There has been a large increase in the number of cases treated at the dispensaries, and the number of cases treated in villages in the Central Provinces has almost doubled. The good work done by the Veterinary Assistants on tour is beginning to result in increased sympathy being shown by the people in the work of the Department. Satisfactory progress has been made in the training of Veterinary Assistants in the method of inoculation against rinderpest, and 1,823 animals were inoculated during the year. The statement attached to the Director's Report shows that there has been marked recovery in the agricultural stock of the provinces, cattle of all kinds having largely increased in number. The Cattle-breeding Farm at Telinkheri near Nagpur continues to make good progress, and a second farm has been opened at Hoshangabad and stocked with cattle of the Malvi breed from Indore. The Jaitpur estate under the Court of Wards possesses a valuable herd of Gaolao cattle, and arrangements have recently been made for carefully preserving the herd, a trained Agricultural Assistant having been placed in charge of the farm. Mr. Napier, Deputy Commissioner of Raipur, has also started a Cattle-breeding Association at that place. It is unnecessary to commend veterinary work to the good will of the Deputy Commissioners, but it would appear from Mr. Jethiji's remarks that they do not always insist on their native subordinates giving all the help they can.

14. The improvement of the Provincial Museum at Nagpur awaits completion of the building for the Victoria Memorial Technical Institute. Many of the present exhibits are of little value, and a thorough overhauling of the museum will be made when those belonging to the economic, agricultural, geological and technical branches have been removed to the new building.

15. Efforts were continued during the year to stimulate and revive the tassar silk industry. The Officiating Chief Commissioner has recently obtained the services of Mr. N. G. Mukerji, Assistant to the Director of Agriculture in Bengal, for the purpose of enquiring into and advising on the present state of the industry, and the final report on his investigations is now awaited. These have been conducted chiefly in the Sambalpur District. Mr. Mukerji's opinion is that the main cause of the small outturn of tassar in these provinces is to be found in the degeneracy of the stock, and this he ascribes to the prevalent custom of using only the seed produced by moths hatched from the smallest and weakest cocoons. He has arranged for a settlement of 25 families on a piece of Government forest with the object of testing the result of using only seed produced from large wild cocoons. If the result is satisfactory it will probably be worth while to establish one or more Government depôts from which sound seed would be issued to rearers.

16. In last year's review a reference was made to Major Buchanan's enquiry into the form of paralysis known as "lathyrism." This was submitted during the year, and orders have issued to the Inspector-General of Civil Hospitals, as separately intimated to the Government of India, for the supply of samples of the *lakh* or *teora* grain to the Director of the Pasteur Institute at Kasauli for the conduct of toxicological experiments in connection with the malady. A short pamphlet has also been drawn up for general distribution and for insertion in the school readers, showing the pernicious effect of *teora* on the human constitution.

17. The work of the Department has been growing largely of late, and as already remarked, it forms a severe tax on the officer, who has also to administer the important departments of Settlements and Land Records. Mr. Lely considers that the results obtained have been most creditable to Mr. Sly and that he is to be congratulated on the progress which the Department has made in his hands. The excellent services of Mr. Joshi, the Assistant Director, are again brought prominently to notice. His services in the cause of agriculture have recently been recognized by the grant of the title of Rao Bahadur. The Administration is much indebted to Mr. Mollison for the valuable advice and assistance which he has given.

ORDER.—Ordered, that a copy of this Resolution, together with the enclosures, be submitted to the Government of India in the Revenue and Agriculture Department, and that copies be forwarded to the Commissioner of Settlements and Agriculture, and to all Commissioners and Deputy Commissioners, Central Provinces, for information and guidance, and that it be published in the Supplement to the *Central Provinces Gazette*.

[True Extract.]

B. ROBERTSON,

Chief Secretary to the Chief Commissioner,

Central Provinces.

Secretariat Press, Nagpur:—A. E. J., 14-11-1904—575.

No. $\frac{5259}{1-3}$

FROM

B. P. STANDEN, ESQ., I. C. S., C. I. E,

DIRECTOR OF AGRICULTURE,

Central Provinces,

TO

THE CHIEF SECRETARY TO THE HON'BLE THE CHIEF COMMISSIONER, CENTRAL PROVINCES.

REVENUE DEPARTMENT.

Nagpur, the 6th October 1904.

SIR,

I beg to submit the Annual Report on the Department of Agriculture for the year ending the 31st March 1904. I regret the late submission of the report. The main cause of delay is pressure of work.

I.—PREFATORY.

2. The special establishment employed consisted of one Assistant Director and six Agricultural Assistants. The period for which these assistants were originally entertained expired on the 31st March 1904, but the Honorable the Chief Commissioner was pleased to sanction their retention for a further period of one year ending the 31st March 1905. The two appointments of Agricultural Superintendents which were provided for in the reorganization scheme were not filled.

Changes in the personnel of the Department.

3. The post of Director was held by Mr. Sly, up to the 17th of March 1904, when I relieved him of the charge of the Department. The post of Assistant Director was held by Mr. Joshi throughout the year. One Agricultural Assistant was found unsuited for the work required of him and was reverted to his Revenue Inspectorship. Otherwise the staff of Agricultural Assistants remained unaltered. There are signs of an increasing demand for trained practical Agriculturists to take charge of private farms under Court of Wards management, and I am contemplating the desirability of expanding the existing arrangements for preliminary training following on the completion of the Agricultural School course.

Touring.

During the year Mr. Sly inspected demonstration plots in Hoshangabad and Bilaspur, the Inspector-General of Agriculture accompanying him to Bilaspur. He also attended a meeting of the Industrial and Agricultural Associations at Sambalpur. Accompanied by Mr. Joshi, he inspected the Experimental and Cattle-breeding Farms at Poona, Charodi and Surat in the Bombay Presidency and attended the Agricultural Conference that was held at Surat. With the exception of August, Mr. Joshi was on tour in every month of the year with the object of choosing sites for, and inspecting demonstration plots, initiating work at the new Experimental Farms at Hoshangabad and Raipur, demonstrating the advantage of the Poona sugarcane mill, boiling-pan and furnace, purchasing cattle of the bull-breeding farm in Hoshangabad and attending meetings of the District Agricultural Associations.

The Assistant Director of Agriculture's work becomes heavier every year, and it seems likely that it will be necessary before long to fill up one at least of the Agricultural Superintendentships.

II.—Agricultural Education.

Agricultural school.

5. There was no change in the organization of the Agricultural School at Nagpur. The new hostel was occupied during the year, and a gymnasium instructor has been appointed. The Victoria Institute is not yet ready and the school was taught in the old class rooms during the year under report.

English classes.

6. There were ten students in the Senior English class, of whom eight appeared at the final examination and five passed. The junior class had 14 students, all of whom appeared for examination but only 10 passed. Of the two remaining students of the senior class, one was ill on the date of examination and the other is the holder of the scholarship at the Poona College of Science. Two of the junior class, who failed in less important subjects only, were allowed to pass to the senior class There were still some middle school pass students in the class—one in the senior and three in the junior class. It was noticed that their deficient knowledge of English affected the results of the examination in their case. The Reverend Doctor Robertson of the Hislop College, who has been good enough to examine in Botany, Chemistry and Geology for several years, considered that the school showed more improvement, but the Inspector-General of Agriculture, who kindly consented to examine in the written test in agriculture, found that the results of the examination showed defective teaching. Plague necessitated the closing of the school for 2½ months, and although the full course was made up by prolonging the season into the hot weather, this break in the studies of the scholars must have prejudiced the result of the year's instructions to some extent. I regret that I have not had time to give the school much attention myself, but when considered with the remarks passed by my predecessor in paragraph 6 of the report of 1902-03, the results of the year certainly point to the conclusion that the teaching is not so good as it should be. I think there may be other contributory causes, of which one may be the custom of allowing boys to join the junior class some time after the commencement of term. I find that very few of the junior class students join the school at the beginning of term. The classes open on 1st June, the beginning of the Agricultural year; but the junior class is rarely fully assembled before the end of August; in the year under report one boy joined on 11th September. The result of the matriculation examination is generally not known until about 15th May, and unless a boy has made up his mind beforehand what he is going to do in the event of passing, he is apparently not ready to join by the beginning of term. Four scholarships are annually offered by the Director of Public Instruction to matriculated students of this school. Applications are not made until after the results of the matriculation examination are published and have then to be considered by the educational authorities and finally sanctioned by the Director of Public Instruction; all this takes time, and the result is that the scholarship-holders are always the last to join the school. If students are to show respectable results in their second year, they must be well grounded in their first year, and this must be difficult, if not impossible, when they lose some months of the course. I shall consult the Director of Public Instruction with reference to this defect and hope it may be possible to remove it. It may be necessary to refuse to admit any student after the beginning of term. The number of passed men turned out every year is very small compared to the demand in the Land Revenue and Agricultural Departments. On an average there are 23 substantive appointments of Revenue Inspectors to be filled every year. It is desirable that the majority of these should be given to Agricultural school men. It is probable that with the return of more prosperous times there will be some demand for trained practical agriculturists to manage farms belonging to private estates. If the average number of men passing out were increased threefold, employment would be available for all. The Director of Public Instruction has kindly promised to advertise the school in all Matriculation classes of the Central Provinces and Berar. The expenditure on these classes was Rs. 3,322.

Normal School Classes.

7. Until the year under report there had always been more Hindi than Marathi students in this class, and it had therefore been the custom to put some of the Hindi students in the Marathi section. The advent of some Berar men in the second session of the current year enabled the Principal to remedy this. Of the 50 school-masters who attended the first session, 45 passed the examination. 27 school-masters and 41 young men from the Normal Schools at Jubbulpore, Nagpur, Raipur and Akola joined the classes at the second session, but of these 7 absented themselves after the outbreak of plague in the town. Out of the 61 who appeared for examination, 54 obtained certificates. A few of the masters who have been through this class have done some commendable practical work at their schools. School gardens are too small as a rule for the demonstration of new methods in the cultivation of field crops, but may be and are used to some extent as a means of bringing new garden crops and new varieties of field crops to the notice of cultivators. In a few schools the masters have persuaded the malguzars or some other member of the school panchayat to give them a plot of land large enough to exhibit the effect of new methods of cultivation. If efficient arrangements can be made for the regulation and supervision of these demonstrations, they may prove a valuable adjunct to the experimental farms.

The Malguzari Class.

8. The cost of this branch of the Agricultural school was Rs. 3,267. Twenty-three pupils joined this class, but three left owing to various causes and 20 appeared at the examination, of whom 18 passed. I hope in the coming camping season to be able to visit the homes of some of the passed pupils of this class and ascertain what result they have to show for the money that has been spent on them. The cost of this class was Rs. 1,927.

Publication of Agricultural information.

9. The Agricultural Gazette continues to be much appreciated and widely read. The number of subscribers has risen from 1,823 to 2,035 during the year under report. The publication is also issued free to 395 official and 249 non-official gentlemen so that the total distribution now amounts to 2,679 copies. The total increase is 312. This increase in the circulation is an indication that this publication is appreciated by Agriculturists. It is a really useful medium for the dissemination of Agricultural information. During the year under report a Marathi edition of the journal has been issued, which is distributed in the Marathi-speaking districts in Central Provinces and also in the districts of Berar. Most of the subject-matter is now supplied by officials of the Agricultural Department, but the reports of the proceedings at meetings of the District Agricultural and Industrial Association already form an interesting item in some issues.

A summary of the Kirsani Samachar for the year 1903-04 has also been published in Marathi and Hindi. This book contains matters of permanent interest connected with agriculture. The Department of Public Instruction has purchased a number of copies for distribution to village schools. The staff of my office has been strengthened by the addition of a translator, whose duty it is to translate contributions into Hindi and Marathi.

Other official publications.

10. The usual crop forecasts, trade and seasonal crop reports were issued. Leaflets on the following subjects were also issued during the year :—

(1) Motitura juar.
(2) Selected Saoner juar.
(3) Ganeri juar.
(4) Cold season til.
(5) Sorghum collier.
(6) Chaoli.
(7) Awned bajra.
(8) Chinore paddy.
(9) Early paddy.
(10) Ground-nut.

(11) Acclimatized Upland Georgian cotton.
(12) Jaunpur maize.
(13) Utilization of night-soil as manure.

III.—Agricultural Enquiry and Experiment.

A.—Experimental Farm.

11. The annual report of the Nagpur *cum* Telinkheri, Pawarkhera and Labandih Experimental Farms was submitted with my letter No. $\frac{4825}{1-7}$ dated the 17th September 1904.

The monsoon was unfavourable for rain crops. Germination was good, but excessive rain in the latter half of July and throughout August prevented timely weeding and seriously affected all crops except juar grown on the land manured on the Meagher system. Maize was completely destroyed. In October there was good sowing rain for rabi crops; and in spite of the absence of winter showers, all crops yielded well, particularly linseed and peas. During the year the Public Works Department undertook the improvement and extension of the irrigation work which provide the Farm and the Maharaj Bagh and Telinkheri Gardens with water from Telinkheri tank. The work has not yet been satisfactorily completed.

Abstract of work carried on at Nagpur Farm.

12. The work performed on the Farm may be considered under several heads:—

(*a*) *Experimental cultivation to determine the comparative merits of different methods of cultivation.*—In 1902-03, under the advice of the Inspector-General of Agriculture, the scheme of experiments was subjected to extensive alterations; consequently out of the 9 series only 2 for testing the effect of different manures on wheat are likely to afford conclusive results in the near future. The interesting remarks of the Superintendent on these two series indicate that material for the issue of a bulletin on part of this subject at least will soon be available.

(*b*) *Cultivation of different varieties of crops with the view of discovering good varieties well suited to this part of the provinces.*—Out of a large number of varieties cultivated, only three kinds of early rice from the Punjab and one variety of bajra from Allahabad were considered worth cultivating on an extended scale in the current year.

(*c*) *Cultivation of selected varieties for seed distribution.*—Seed of 5 varieties of cotton, 4 of juar, 2 of rice, 4 of wheat, and 16 of other crops was distributed, most of it through the District Agricultural and Industrial Associations. The acclimatized Upland Georgian cotton seed was distributed for the first time. Part of it was given out through the Manager of the Empress Mills, and arrangements are being made to ensure that the cultivators shall receive the full value of the produce.

(*d*) *Production of new varieties of cotton and wheat obtained by cross-fertilization.*—The experiments in this direction, which were commenced in the preceding year, have been continued. The object is to produce a cotton combining the productive powers and hardiness of the local varieties with the higher class lint of exotic kinds, and to produce a rust-resistant wheat of good milling quality. 21 varieties of hybrid cotton were cultivated, and the Manager of the Empress Mills kindly examined and reported upon the lint of 17 of these. The results are decidedly encouraging. 23 varieties of hybrid wheat were cultivated, but it is too early yet to pronounce any decided opinion on the result.

(*e*) *Investigation of plant diseases.*—Experiments were continued with the view of determining the degree of strength to which sulphate of copper solution can be safely used for preventing smut in juar, and endeavours were made, in collaboration with Dr. Butler

(Cryptogamic Botanist to Government of India) and Dr. Leather (Agricultural Chemist to Government of India) to discover a remedy for the fungoid disease which frequently ruins the tur crop in these provinces.

(*f*) *Trial of implements.*—Several new implements were tried during the year with good results, and one of these, a cheap fodder-cutter, may find a market amongst cultivators in the Nagpur country and Berar.

(*g*) *Work in combination with the Demonstration Branch of the Agricultural Department.*—The Demonstration Branch made use of the results worked out on the farm in the following directions:—

Introduction of new or improved varieties of crops.
Introduction of fodder-cutters and winnowing machines.
Prevention of smut in juar.

This subject is dealt with in greater detail in later paragraphs of this report.

12. The Telinkheri Farm is worked as a supplement to the Nagpur Farm, and is chiefly used for the purpose of producing seed of approved new or improved varieties for distribution to cultivators.

Pawarkheda and Labandih Farms.

13. The new experimental farms at Pawarkheda near Hoshangabad and Labandih near Raipur were purchased during the year under report: but there was not time to get them into proper order before the sowing season. The work performed on these farms during the year was therefore confined to the clearing and preparation of the land for experimental purposes. A considerable area was put under crop with the object of improving the condition of the land. A programme of experiments was drawn up with the assistance of the Inspector-General of Agriculture and experimental work has begun in the current year on both farms. Rabi is the main subject at Pawarkheda, cotton and juar at Nagpur, and rice at Labandih.

B.—Agricultural demonstrations and enquiries.

Introduction of juar and cotton cultivation into Chhattisgarh.

14. The demonstration of juar and cotton cultivation was continued on the same lines as in the preceding year and in the same districts. These crops are being introduced into Chhattisgarh with the object of providing a crop which will succeed in a year in which rice would give a low outturn and of securing to the cattle a better supply of fodder than is at present available for them. There are several obstacles in the way. In the first place the people have never eaten the grain and prefer their rice; the cattle also take up the same attitude and refuse the fodder at first, though with a little persuasion they can be induced to eat it, and if a large supply became available would no doubt before long eat it as readily as cattle of other tracts. Lastly, these crops will ordinarily succeed in Chhattisgarh only in well drained black soils, such as are found in the neighbourhood of considerable rivers. The first demonstration of these crops was made in 1902-03. This was a year exceptionally well suited to juar and cotton; the rainfall was so defective that rice failed. Both the crops on the controlled demonstration plots and those raised by cultivators from seed distributed by the Agricultural Department through the agency of Mr. R. W. Johnson, the Superintendent of the Public Garden at Raipur, gave good outturns. The year under report was as unfavourable to these crops as that preceding had been favourable, and it is to be feared that the cultivation has received a check from which it will take some years to recover. In the Burha Garden at Raipur and in the demonstration plots managed by the two Agricultural Assistants (1 in the Raipur and 5 in the Bilaspur Districts) fair to good crops were reaped. But a large quantity of seed which was again distributed by the Agricultural Department through Mr. Johnson in Raipur, Bilaspur, Sambalpur and the neighbouring Feudatory States, as well as Rs. 800 worth of seed given by the Deputy Commissioner, Mr. Napier, was sown in flat or low-lying black soil contrary to the instructions in the leaflets sent with the seed, and most of it failed. It is natural that the cultivators who sowed this seed, most of whom

have never seen a properly cultivated crop of juar, should be very reluctant to try it again. It is doubtful whether the wholesale distribution of seed, under conditions which do not admit of supervision of the cultivation, is the best way of pushing the crop. I agree with my predecessor in his opinion, that neither cotton nor juar is ever likely to be a success in the level stretches of black soil in Chhattisgarh.

There are nevertheless considerable areas in which they can be grown with profit. I think the most effectual way of establishing these crops in Chhattisgarh is to confine our attention strictly to a few of the most suitable tracts in Raipur and Bilaspur, to maintain controlled demonstration plots year after year in one or two of these areas, and to distribute small quantities of seed to a few selected cultivators in all of them, the distribution to be made on the spot by a responsible official who knows the sort of soil required and while giving out the seed can point out the field in which it is to be sown. At the same time arrangement should be made to train a few pairs of Chhattisgarhi bullocks. Straight driving is not required for any kind of cultivation now practised in Chhattisgarh, and it is the custom to drive bullocks in the plough without a nose rope. It is impossible to get them to pull the "argada" straight enough to permit of the subsequent use of the bullock hoe, and consequently juar and cotton cannot be given all the cultivation they require. Mr. Johnson has shown by his work in the public gardens at Raipur that the best varieties of the Nagpur country will produce heavy crops in manured and highly cultivated land even in Chhattisgarh. He has also introduced the variety of juar which is grown in Dharwar in the rice fields. It is thought that this variety may show itself specially suited to Chhattisgarh. In addition to the demonstration plots, juar and cotton are being experimentally cultivated in the experimental farm lately established at Labandih near Raipur. Continuous cultivation and selection at this farm may produce a seed better suited to the climate and soils of Chhattisgarh than any at present in cultivation. The effect of the seed distribution and demonstrations of 1902-03 and 1903-04 is shown in the table of areas below :—

District.	Area, 1901-02.		Area, 1902-03.		Area, 1903-04.	
	Juar.	Cotton.	Juar.	Cotton.	Juar.	Cotton.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Raipur	1,405	9,426	12,254	12,981	17,028	18,988
Bilaspur	1,505	5,721	1,054	5,969	1,848	6,250

Although the crops fared badly last year, there must have been sufficient seed available to sow a large area this year even without any further distribution of seed, and it will be interesting to see what the effect of the preceding year's failure has been.

Demonstration of improved methods of kharif cultivation in Hoshangabad District.

15. In Hoshangabad District five demonstration plots were cultivated to teach cultivators the advantage of Nagpur methods of cultivating cotton and juar over the local customs of broadcast sowing with subsequent hand-weeding only. The plots were successfully cultivated by the Agricultural Assistant Govind Raghoba. My predecessor showed some of these plots to the Honourable the Chief Commissioner and the Honourable the Finance Member of Council, who expressed themselves satisfied. Sir E. Law kindly promised to give a prize of Rs. 50 to the cultivator who should show the best cultivated field in the current year.

Demonstration of ensilage.

16. The preparation of silage was demonstrated at one place each in Raipur and Bilaspur and three places in Hoshangabad. In the latter district the custom of storing grain in pits provides a convenient means of making silage. In Raipur and Bilaspur, where grain cannot safely be kept underground, the soils consisted of cheap plastered erections in the corner of the cattle-shed. The results are reported to have been satisfactory. There is no doubt that in some parts of the country ensilage will become popular. Berar is a particularly promising field for it.

Demonstration of implements.

17. The use and advantages of a fodder-cutting machine (Messrs. Harder and Co.'s Ensilage Cutter and Shredder) and of a winnowing machine (Fearless Fanning Mill) were demonstrated by an Agricultural Assistant in Seoni, Nagpur, Wardha, Hoshangabad, Chhindwara, Nimar and Betul. As a result 17 winnowers and 14 fodder-cutters together with 6 round-about bullock-gear power machines were sold.

The extension of the cotton area at the expense of juar has now reached such a pitch that the price of juar fodder in the hot weather months, and at the beginning of the monsoon, is very high. The saving effected by the use of the fodder-cutter should appeal strongly to the cattle-owners of the cotton and juar country. Much labour that could be usefully employed in the fields is used in the tedious process of winnowing now in vogue all over the country, and it occasionally happens that the hot-weather winds are so weak that the cultivator has difficulty in completing his winnowing before the monsoon breaks. It is probable that there is a market for these machines amongst substantial cultivators. After using them themselves, they may let them out to poorer men, as is the custom with sugarcane mills.

Demonstration of improved method of gur manufacture and analysis of cane juice.

18. The demonstration of improved method of gur manufacture combined with an enquiry into the causes of the decrease of the area under sugarcane in some districts of the Central Provinces, which was commenced in the preceding year, was continued in the year under report. And the scope of the enquiry was widened by the deputation of an Assistant from the office of the Agricultural Chemist to the Government of India for the purpose of testing the constituents of the juice of different varieties of cane grown in different localities Unfortunately the results of these analysis were inconclusive, because the juice of different varieties was tested together and not separately. The Malguzar of Betul Khas bought the Poona apparatus which Rao Bahadur Joshi took with him for demonstration purposes.

Sale of implements.

19. The sale of implements shows signs of becoming an important part of the Agricultural Department work. A statement below shows the sales during the current year. Most localities can show some implement more efficient than any of its class used elsewhere, and the introduction of the best types of implements into new localities is a form of agricultural improvement in which the department can usefully engage. There are also two or three European or American implements which can be usefully introduced to the notice of the people :—

Statement showing the sale of implements from the Experimental Farm, Nagpur, during 1903-04.

No.	Name of District.	Swedish ploughs.	Turn wrest ploughs.	Smalley cutters.	Juni or feed cutters.	Level cutters.	Hand thresher.	Winnower.	Bullock gears.	Broadcast sower.	Corn sheller.	Bucket pumps.	Perfection sprayer.	Sugar pans.	Wide scraper.	Bakhar.	Argarhen.	Tifan.	Nari plough.	Yoke.	Bullock hoes.	Remarks.
1	Nagpur ...	...	1	3	4	3	1	2	1	...	...	1	2	...	...	...	...	...	...	...	...	
2	Bhandara ...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
3	Chanda ...	3	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	
4	Wardha ...	4	...	5	...	...	...	...	...	...	5	...	...	...	...	...	...	1	...	...	...	
5	Balaghat ...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
6	Jubbulpore ...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	
7	Damoh ...	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	
8	Seoni ...	2	...	...	...	...	1	...	...	7	...	1	1	...	...	...	...	4	...	...	...	
9	Hoshangabad ...	3	3	1	...	...	1	3	1	...	...	...	...	...	1	5	1	...	...	...	6	
10	Narsinghpur ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	
11	Chhindwara ...	...	...	1	...	...	...	1	2	...	...	...	...	...	...	...	...	...	...	...	...	
12	Betul ...	...	...	...	1	...	...	1	...	...	1	...	...	1	...	1	1	1	...	...	2	
13	Nimar ...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
14	Raipur ...	8	1	1	...	...	1	1	1	...	...	...	...	...	...	6	2	1	1	5	4	
15	Berar ...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
16	Bengal ...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	
17	Sindh ...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	
	Total ...	28	6	11	6	7	4	10	6	7	6	2	3	1	1	12	4	11	1	6	12	

Demonstration of Meagher system of sewage disposal.

20. The Meagher system of sewage disposal was demonstrated at Chanda, Wardha, Hoshangabad, Raipur, Bilaspur, Chhindwara and Betul. It takes some time to induce cultivators to use land manure in this way; but when once they have overcome their natural dislike, they esteem this method of manuring very highly. So far as I am aware the only places in which land manured on this method is now cultivated are Nagpur and Sihora (Jubbulpore District). Municipal Committees do not take so much trouble about it as they ought, and it will be necessary to demonstrate by means of Agricultural Assistants the whole operations of one year from preparation of the land to the final hoeing of the crop, instead of sending an Agricultural Assistant only to prepare the land as has been done hitherto.

Destruction of grasshoppers in Bilaspur and Raipur.

21. In Bilaspur and Raipur grasshoppers were again very numerous in the rice fields. Under the advice of my predecessor, the Deputy Commissioners of these Districts organized a campaign against the insects in certain villages (100 villages in Bilaspur 50 villages in Raipur). Selected Revenue officers were put in charge of the operations. At first some pressure was necessary to induce the cultivators to work with energy, but when they were fully persuaded that good results could really be attained they worked with a will and the 150 villages selected for special effort were practically cleared of grasshoppers. The officials in charge were Khan Sahib Elijah Jacob, Extra-Assistant Commissioner, Raipur; Vishnu Gangadhar Gadgil, Baji Rao Nimbalkar, Ragunath Prasad, Tahsildar, Additional Tahsildar and Naib-Tahsildar, respectively, of Janjgir Tahsil. I beg to bring their names to the notice of the Local Administration. Some crop experiments in Raipur show that the effect of the operations was to save about half the rice crop. I visited the Janjgir villages in August of the current year and found that there were very few grasshoppers to be seen. How far this is due to the wholesale slaughter of last year and how far to the heavy rain which fell in June it is imposible to say. In Nimar the Bombay locust (*accridium succinctum*) was again very much in evidence. These insects are much more difficult to deal with than the rice grasshoppers. The presence of water in the rice fields makes it comparatively easy to kill the latter wholesale. No report of the results of the operations in Nimar was received, but I believe they were initiated at too late a date for the attainment of good results.

Demonstration of the method of pickling juar seed as a preventive against smut.

22. Demonstrations of the advantage of pickling juar seed in a solution of sulphate of copper as a preventive against smut were again carried out in Nagpur and Wardha and were initiated in the Chhindwara District. The results were as follows:—

	Villages in which demonstration made.	Number of cultivators who sowed pickled seed.	Area sown with pickled seed.	Area in column 4 sown with seed pickled.	
				At Government expense.	At cultivator's expense.
			Acres.	Acres.	Acres.
Nagpur	1,602	10,168	24,881	14,769	10,112
Wardha	1,112	5,486	40,679	19,247	21,432
Chhindwara	562	3,270	4,045	4,025	120

Smut was rare, so the advantage of the seed pickling was not well exhibited.

Rust-proof wheat.

23. Seed of the hybrid of Haura and Mundia Pissi was again distributed in a number of districts, but as the season was not favourable to rust the results are inconclusive.

Experiments in embanking black-soil in Hoshangabad District.

24. The experiments in black soil field embankments were continued during the current year on a large scale in Hoshangabad. Rupees 3,183 was spent by the Irrigation Department in completing large embankments, such as are found in the Saugor

District and the Bijeragogarh Pargana of Jubbulpore, and Rs. 16,777 was expended under the orders of the Deputy Commissioner in embanking fields on the Jubbulpore haveli system on which each field is enclosed in its own embankment. Land was embanked on this system in 8 villages. It is unfortunate that the rainfall of the current year has been too short in Hoshangabad to fill the embanked fields. We shall have to work till next year before arriving at any conclusion.

Results of crop harvesting for determination of standard outturns.

25. The results of 962 crop cutting experiments were reported to my office during the year, as against 1,157 in the previous year; but this year's figure includes 56 from Berar. I am not sure whether this number represents all that were made, for I believe that the results of crop experiments are not always duly recorded in district offices. In Mandla the Settlement Officer and his staff made as many as 285 experiments. Mr. Mayes, with 16, has the best record of any Deputy Commissioner. In spite of my predecessor's request that special attention might be paid to *ringni* or cold-weather juari, only seven experiments were made in this crop. At his request experiments are also being made in the principal mixed crops, with a view to testing the accuracy of the proportions in which the separate crops are divided for statistical purposes, and special reports of these are awaited. The number of experiments made in Berar is very small, and experiments have hitherto been confined to only five taluks, but the Honourable the Chief Commissioner has now ordered that they shall be extended to the whole of Berar and this will be done during the coming season. It would appear that the subject requires special attention in Berar, for in the few cases in which experiments have been made by officers of superior rank, it has almost invariably been found that the outturns obtained are much higher than those shown in the reports of inferior officials, who do many of the experiments in Berar, and on whose reports the average acreage outturns are calculated. These outturns are most suspiciously low. The subject is receiving my attention, and I hope to be able to bring the Berar arrangements into line with those in force in the Central Provinces. At present the chief steps necessary are to entrust the conduct of experiments to officers of superior rather t han inferior rank, to ensure that the results are properly compiled, and to make the experiments more numerous.

District Agricultural and Industrial Associations.

26. Agricultural and Industrial Associations have been established in all districts. The following meetings were held during the agricultural year 1903-04 :—

District.	Number of Meetings.	
	Attended by Assistant Director of Agriculture or Superintendent of Farm.	Not attended by Agricultural experts.
Damoh	...	2
Seoni	...	2
Narsinghpur	...	2
Nimar	...	3
Chhindwara	1	1
Wardha	...	1
Nagpur	2	...
Chanda	1	...
Raipur	1	1
Bilaspur	1	...
Sambalpur	1	...

The members were named and a programme adopted in Hoshangabad in 1902, but no meeting has been held. It was found impossible to arrange that the Assistant Director of Agriculture or the Superintendent of the Nagpur Experimental Farm should attend all meetings.

A good deal of work has been done by some of the Associations during the year, but failure to report results in all cases has deprived the work of a good deal of its value. The crops shown in the attached statement were sown by members of the Associations:—

Statement showing crops sown by members of District Agricultural Association.

District.	Upland Georgian.	Jannpur maize.	Rala.	Bajra.	Ganeri juar.	Motichura.	Early juar.	Dharwar juar.	Sorghum fodder.	Early paddy.	Chimur paddy.	Hybrid wheat.	Ground-nut.	Sambalpur chaoli.
Betul ..	...	50 lbs.	...	30 lbs.	*Nil.*	...	100 lbs.	*Nil.*	50 lbs.	*Nil.*	*Nil.*	200 lbs.	*Nil.*	10 lbs.
Nimar ...	...	*Nil.*	...	30 lbs.	...	...	...	...	...	...	...	100 lbs.	Yes.	...
Nagpur ...	...	...	...	*Nil.*	*Nil.*	...	*Nil.*	*Nil.*	50 lbs.	*Nil.*	*Nil.*	*Nil.*	...	10 lbs.
Chhindwara ...	..	100	...	*Nil.*	500	...	500	...	10 lbs.	...	...	100	...	10 lbs.
Wardha ...	...	...	...	*Nil.*	...	...	...	...	*Nil.*	...	...	...	...	...
Jubbulpore ...	...	...	...	*Nil.*	...	...	...	...	50 lbs.	...	...	200	...	...
Narsinghpur ...	10 lbs.	25	...	30	...	...	...	...	50 lbs.	...	...	...	...	...
Saugor ...	...	...	...	*Nil.*	...	...	...	...	50 lbs.	...	...	100	...	10 lbs.
Seoni ...	...	...	...	*Nil.*	*Nil.*	...	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	100 lbs.	...	10 lbs.
Hoshangabad ...	...	...	...	*Nil.*	...	...	...	...	...	...	...	100 lbs.	*Nil.*	10 lbs.
Sambalpur ...	...	...	190 lbs.	*Nil.*	250 lbs.	250 lbs.	...	250	...	1,000	500	...	...	...
Balaghat ...	...	100	20 lbs.	*Nil.*	...	...	...	...	...	...	...	...	...	...
Bhandara ...	...	...	20 lbs.	*Nil.*	...	...	...	...	...	...	...	...	...	...
Raipur ...	200 lbs.	...	...	*Nil.*	900 lbs.	550 lbs.	900 lbs.	...	...	500 lbs.	250 lbs.	...	...	...
Bilaspur ...	200 lbs.	...	...	*Nil.*	...	...	...	...	...	500 lbs.	250 lbs.	...	...	...
Damoh ..	...	20 lbs.	...	...	...	...	...	...	...	...	...	100	...	...

Of these both the Chimur and the Halki rice were generally approved and will probably remain in cultivation in several districts where they were before unknown. The hybrid Haura-Mundia wheat gave good crops, and is liked as a good marketable grain apart from its rust-resistant properties. Madras ground-nut and the awned bajra gave satisfaction also. Saltpetre is not likely to be much used for wheat except in irrigated land, as it is expensive and does not always pay in the absence of winter showers. It was found invariably to improve the outturn of rice. Fodder-cutters, winnowers, the tifan seed drill, and the broadcast sower were tried. Under the auspices of the Director of Agriculture some of the members of the Raipur Association formed a company with a small capital with the object of improving the local breed of cattle. The Seoni, Raipur, Wardha, Narsinghpur and Nagpur Associations show the most promising results. It is essential that the Associations should devote their attention to a limited number of subjects; that every member who undertakes work should report the result in a useful form; that arrangements should be made to preserve the seed of promising new varieties for distribution in the succeeding year; and that every Association should keep a careful account (in addition to minutes of meetings) of the work undertaken and the results attained. These Associations are still in their infancy and the Central Association at Nagpur is not yet properly constituted. I anticipate that in a few years they will be able to show much better results than have yet been attained. The progress of the Association has again shown very markedly that the exhibition by the Deputy Commissioner of a strong interest in agriculture is necessary to success.

IV.—HORTICULTURE.

Public Gardens.

27. My annual report on the management of the Provincial, District and Court of Wards Gardens was submitted with my letter No. 4267—25, dated the 20th August 1904. The financial management of the Maharajbagh and Telinkheri Gardens at Nagpur has somewhat improved, and horticulture was fairly successful in spite of the disturbing influence of plague, which not only caused two overseers at Telinkheri to abandon their posts, but also interfered seriously with sales. I am endeavouring to get a good Superintendent for these gardens. At the Maharajbagh a house for large foliage-plants has been built. Experiments in the cultivation of American and indigenous varieties of the sweet-potato were continued with fair

success. There was no important addition to the Menagerie. At Telinkheri the Dancing Hall, which was reconstructed, is gaining in popularity. The water-supply of the garden has been improved by the laying out of irrigation pipes. At Pachmarhi liberal expenditure in improvements and careful management have resulted in great improvement of the gardens. Particular attention has been paid to the water-supply, which is now fairly adequate. The number of gardens maintained by Government at District head-quarters fell from fifteen to fourteen owing to the abandonment of the Chanda garden, which was never successful. The number of fruit-trees and plants was more than double that of the previous year, very good work in this direction being done at Sambalpur. Good work was done in some districts, notably Raipur, in meeting the demands of schools for tree-planting on the newly instituted Arbor Day. With keen co-operation on the part of the Educational Department, the District gardens should be able to render invaluable assistance in this movement. The acclimatized Khaparkhera variety of peas was successful in most districts, and produced excellent results at Raipur and Sambalpur. It was also most successful at Pachmarhi, and would therefore seem to be well adapted to climates of very different kinds. It takes its origin from German seed sown in a village, Khaperkhera, of Hoshangabad. Experiments with Jaunpur maize and American sweet potatoes were continued with varying success, but suffered respectively from excessive moisture and the effects of frost. The financial management of the gardens was a good deal more successful than usual. Gardens are maintained in Court of Wards estates in Hoshangabad, Chanda and Wardha, but in other districts the poverty of most estates prevents any experiments in this direction.

V.—VETERINARY.

General. 28. The office of Superintendent, Civil Veterinary Department, was held by Mr. J. S. Jethiji throughout the year, except for two months during which he was on leave. On the 12th January 1904, the Berar establishment was placed under his control. His annual report has been submitted with my letter No. 4380-119, dated the 26th August 1904, and it will suffice if I notice here a few of the more important features of the year's work.

Veterinary dispensaries. 29. During the year three new dispensaries were opened in the Central Provinces and five in Berar, making a total of 12 in the Central Prrvinces and 17 in Berar. Since the close of the year the establishment in Berar has very nearly reached the standard declared necessary by the Government of India, and when one more dispensary is opened, there will be one for each taluq. In the Central Provinces we are still far below the minimum required. During the year three districts—Betul, Chanda and Sambalpur—remained entirely unequipped. Our present aim is to have a dispensary at each tahsil head-quarters, with one or two Veterinary Assistants, according to the size of the head-quarters town, but in most districts the funds of the District Council will not permit of any immediate progress, while municipalities are singularly slow to recognize their duties in this matter. Considering that a very large majority of the animals brought to Veterinary dispensaries for treatment come from within municipal limits, it might reasonably be expected that municipalities should contribute at least the greater part of the pay of the Veterinary Assistant who remains at head-quarters, in cases where two are entertained. The number of cases treated at dispensaries increased considerably in the Central Provinces and largely in Berar. It is satisfactory to notice that a good deal more touring was done than in the previous year, and the number of cases treated in villages in the Central Provinces has almost doubled. In Berar, where each dispensary has only one Veterinary Assistant, little touring is done at present.

Reorganisation of staff. 30. My predecessor's proposals for a pension scheme have been sanctioned, and should result in making the subordinate service more attractive. It is still very difficult to get a good class of men as Veterinary Assistants, and I believe this is a difficulty which is felt throughout India. Service in the Central Provinces is unattractive to up-country

men, and the two students whom we annually send to Lahore for training are quite insufficient to meet our needs. Proposals for the strengthening of the superior inspecting staff have been sent by the Government of India for the opinion of the Local Government, and if it is found possible to carry out the scheme therein contemplated, we shall have a means of checking the work done by subordinates on tour, while the Superintendent will have more time at his disposal for independent investigation and research.

Prizes for cattle-breeding.

31. The Superintendent attended cattle fairs at Singhaji in Nimar and Chhapara in Seoni, but none of the cattle exhibited were considered worthy of the Government prizes offered. There is little, if any, attempt to breed cattle true to type, and the experiment, so far as these Provinces are concerned, is a failure. I entirely concur with my predecessor's opinion that the money could be better spent on cattle-breeding farms and the raising of good bulls for breeding purposes.

Cattle-breeding Farms.

32. The Telinkheri Cattle-breeding Farm just outside Nagpur continues to flourish. The stock has increased from 47 to 75, and it has been necessary to make additions to the buildings. The grazing area is now fenced with wire, and an intermediate line of fencing has been made in order to separate the male stock from the cows. The farm has been in existence less than two years, so that it has not yet been possible to make a beginning of sending out breeding bulls which is the primary object of the farm. During the year a second cattle-breeding farm was started at Pawarkhera in Hoshangabad and stocked with 46 cattle of the Malwi breed obtained from Indore. It is believed that some of the cattle of the northern districts have a strain of Malwi blood in them, and this breed has been chosen as likely to be the best for crossing with the cows of that part of the Provinces, where the cattle are small, lightly built, and far from being true to any particular types. An Agricultural Assistant has been lent to manage the herd of Gaolao cattle kept by the Jaitpur Estate in the Nagpur District, and Mr. Napier has induced some wealthy inhabitants of Raipur to subscribe towards the establishment of a breeding farm near that town.

The Government of India are considering the advantages of bull-rearing as opposed to bull-breeding farms. The advantages claimed for the former are smaller cost and quicker results. I am doubtful whether these advantages will be realized in practice, and have expressed my views in my report forwarded with my letter No. 3190—120, dated the 25th June 1904. It has been agreed that, if bull-rearing farms are to be established, the best breeds to select from are the Gaolao and Khamarpani for the Nagpur-Berar country, and the Malwi for the Northern part of the Provinces. I have requested the Superintendent, Civil Veterinary Department, and the Assistant Director of Agriculture to note, when on tour, whether there is any probability of obtaining suitable bull-calves of these breeds, and on learning the results of their enquiries I shall be able to report finally on the advisability of establishing farms for rearing bulls. The Inspector-General, Civil Veterinary Department, has promised to assist me in my enquiries, and hopes to be able to pay the Provinces a visit during the next cold weather.

Cattle-disease.

33. Rinderpest, quarter-evil, and foot and mouth disease are all widely prevalent in these Provinces. No less than 250 reports of anthrax were received, but only one case was found to be genuine and this was promptly checked. Outbreaks of anthrax last as a rule so short a time in any one locality and the disease kills so quickly that it is difficult for the Veterinary Assistants to visit the site of the outbreak before it is over. Rinderpest was prevalent during the year chiefly in the Nagpur and Chhattisgarh Divisions, while quarter-evil was most widely spread in Seoni, Saugor, and Betul. Notwithstanding this, 72 per cent. of the cases treated were successfully cured. Foot and mouth disease was less prevalent than usual. Very satisfactory progress has been made in the training of Veterinary Assistants in the method of inoculation against rinderpest, and 1,823 animals were inoculated during the year. Most of the Veterinary Assistants in the Central Provinces have passed through the course of inoculation training at Muktesar, and those in Berar are now being sent. This course is supplemented by practical training at an outbreak under the direct supervision of the Superintendent, and Mr. Jethiji

intends to summon to such outbreaks all untrained Veterinary Assistants within easy reach. It is most satisfactory to note that the people are now beginning to show more sympathy with the work of the department, and this is attributed largely to the good work of the Veterinary Assistants on tour. Some Deputy Commissioners have also given valuable aid, but Mr. Jethiji complains of the failure of many Revenue subordinates to assist him. This is a matter in which improvement can only be effected by the efforts and watchfulness of Deputy Commissioners.

Horse and mule breeding.

34. My predecessor strongly urged the abandonment of all attempts to encourage horse-breeding in these Provinces at Government expense. His proposals were sanctioned by the Government of India, and at the end of October last, the few and ill-selected animals kept for this purpose at Saugor, Damoh and Narsinghpur were sold off, and the small establishment maintained for this purpose abolished.

Live stock returns—Statement B.

35. A year of returning prosperity has resulted in a large increase in the number of agricultural stock in the Provinces. Every division shares in this increase. Plough-cattle appear to have risen largely in number, but the statistics are hardly trustworthy owing to the fact that the term "plough-cattle" is sometimes allowed to include animals that are never used for the plough. But the number of bulls and bullocks in the Central Provinces has increased from 2,914,254 to 3,025,189, while male buffaloes have increased in number from 289,687 to 348,462. There have been similar large increases in the number of cows, young stock, sheep and goats.

VI—Co-operation with enquiry under Imperial control.

Meteorological Department.

36. A report on the efficiency of the registration of rainfall was submitted to the Meteorological Reporter to the Government of India with my letter No. 2593-107, dated the 31st May 1904. During the year four new rain-gauge stations were established. The number maintained in the Central Provinces was 91, of which 12 are observatories under the superintendence of the Meteorological Department. Of the remaining 79, which are under the superintendence of this Department, 13 are under the management of the Medical Department, 16 are maintained by Feudatory States, while the rest are in charge of either Kanungos or Police Muharrirs. There were 12 cases against 18 in the previous year in which the weekly rainfall returns received from the Deputy Commissioners and Feudatory States were found incorrect. The number of inspections of rain-gauge stations during the year, of which reports were received in this office, was 92 against 106 in the preceding year, and 94 in the year 1901-02. The rain-gauge stations which were not inspected during the year are those at Sobhapur, Chicholi, Chimur, Tirora and Gariaband. The number of rain-gauges inspected by Tahsildars was 94 against 80 in the previous year. The Tahsildars in the Mandla and Narsinghpur Districts appear to have made some inspections, but the number has not been reported by the Deputy Commissioners. The defects generally found were faults in the fixing of the rain-gauges, improper state of the rim of the funnel, disrepair of the fencing, and the low position of the mouth of the funnel. The number of rain-gauge stations maintained in Berar during the year was 44. No rain-gauge station was established nor was any abolished during the year. There has been no change in the situation of any gauge, and the mode of registering and reporting the rainfall continued the same. I am arranging to publish the weekly tables for Berar in the *Gazette*, as is already done in the case of the Central Provinces. The number of inspections of rain-gauge stations during the year was 87 against 98 in the preceding year. The results attained during the year are satisfactory.

Co-operation with the Cryptogamic Botanist and the Agricultural Chemist to the Government of India.

37. Specimens of a number of sugarcane diseases were forwarded from Districts, where the cane cultivation is most important, to the Cryptogamic Botanist to the Government of India. The result of his investigations is not yet known. Samples of the oil-seeds of the Central Provinces were sent to the Agricultural Chemist to the Government of India for analysis. His

report on linseed and safflower has been received. It appears that on the whole the linseed of the Central Provinces is equal to that of any other Province, that of Bombay and the United Provinces being equally good, and the produce of other provinces of lower quality. Safflower is of poorer quality. It is an oil for which there is very little demand in the Central Provinces.

Co-operation with the Reporter on Economic Products.

38. At the request of the Reporter on Economic Products the following collections were made and enquiries undertaken :—

(*a*) A collection of yams occurring in the districts of the Central Provinces and Berar was made and sent to him for examination. His report is not yet received.

(*b*) An enquiry was made into the identity, uses and habitat of the plant referred to in the Central Provinces Monograph on Textile Industry as Kandri. The Reporter on Economic Products has not yet determined the name of the plant ; it is being cultivated in the Sibpur gardens and will be identified on flowering.

(*c*) The collection of botanical specimens of gums was continued and a number of specimens was sent to the Reporter on Economic Products.

(*d*) Specimens of varieties of juar grown in Berar were sent for the Economic Museum at Calcutta in connection with the general enquiry into this crop now proceeding.

(*e*) Four species of bees were collected in Hoshangabad and sent to the Reporter on Economic Products.

VII.—Museums.

39. The only museums under Government management are the Provincial Museum at Nagpur and the local one at Raipur. At the former the daily average of visitors has fallen from 283 to 271, the decrease being attributed to the prevalence of plague which visited Nagpur with even greater severity than in the year before. During the year Mr. Cousens, Superintendent of the Archæological Survey for Bombay and Berar, inspected the museum and made suggestions regarding the transfer of some of the exhibits to the new Victoria Technical Institute. Few additions were made during the year. Some improvement was made by the preparation of new cases for the arrangement of exhibits. The museum still contains a good many decayed and useless exhibits, and it is proposed to make a thorough overhauling of the specimens when those belonging to the economic, agricultural, geological and technical branches have been removed to the Victoria Institute. In this Mr. Cousens has kindly promised to assist. It is also proposed to repair the dilapidated ceilings and repaint the walls. The removal of some of the exhibits will make room for the reception inside the building of the heavy statuary which at present encumbers the verandah outside. This will probably all be placed in the large hall at the west end, while the other rooms will be large enough to contain all the lighter exhibits. At present the large hall is almost entirely devoted to the economic, agricultural and geological specimens which are to be removed.

At Raipur the number of visitors to the museum fell from 134,254 to 116,956. Very few contributions were received and nothing was spent on the purchase of specimens. The year opened with a balance of Rs. 347 and closed with one of Rs. 605. The Raipur Municipal Committee increased its contribution from Rs. 150 to Rs. 200. Mr. Gour, Secretary of the Museum, thinks the sum should be still larger, but, as the Divisional Commissioner notes, there is nothing in the financial position of the museum to make an increased contribution necessary.

VIII.—GENERAL.

Supply of fodder at Pachmarhi.

40. Great difficulty has always been experienced in obtaining good fodder for horses at Pachmarhi in the hot weather. My predecessor arranged with Mr. Morris, District Superintendent of Police of Hoshangabad, to collect a large quantity of *dhub* grass from the villages in the neighbourhood of the Nerbudda. This was pressed and baled below the ghat and sold in Pachmarhi. It was much appreciated; Rs. 1,207 worth was sold giving a profit of Rs. 207.

The tassar-silk industry.

41. During the year attempts to revive the declining industry of tassar cultivation and weaving were confined to seven districts in which previous enquiries had shown that some success might be attained. The policy followed was to set apart areas in Government forests for cocoon-rearing, leaving their formal excision to depend on the success of the experiment. No report has yet been received from Chanda and nothing could be done in Chhindwara, Raipur and Bilaspur. Little success was attained in Betul and profits were small in Sambalpur. Only in the Bhandara Tahsil did the experiment meet with real success, and the Deputy Commissioner hopes that the scope of operations will be much extended during the present year. A weaver was sent from Sambalpur to Chanda to teach the local weavers the method of weaving the elaborate patterns of the Sambalpur cloth. This experiment was successful, and the Chanda weavers are now supplying a demand which has arisen for the more artistic textures. An important step has now been taken by the deputation of Mr. N. G Mukerji, Assistant to the Director of Land Records, Bengal, to enquire into the present state of the industry, and the possibility of increasing the local supply of cocoons, which is quite insignificant as compared with the demand. I hope he will also be able to make some suggestions for checking disease and other natural enemies of the worms. Mr. Mukerji will remain in the Provinces for two months. He has fixed his head-quarters at Sambalpur, and has been given an Agricultural Assistant to help him in his enquiries. Mr. Fisher, Conservator of Forests, has also kindly offered to give all possible assistance.

The hand-weaving industry.

42. Efforts to introduce some form of fly-shuttle were made. The Madras loom was definitely abandoned during the year as being entirely unsuited to the Central Provinces. Shortly before the close of the year three different kinds of fly-shuttle looms were set up in the house of a master weaver of the Empress Mills in the middle of the Julaha or Momin's quarters; one of these was the treadle loom invented by the master weaver: another loom was provided with the fly-shuttle attachment invented by Mr. Date, Deputy Superintendent of the Jubbulpore Reformatory School; the third was similar to this last loom, but was also provided with an apparatus for weaving a coloured border to the cloth. It was thought that, as the master weaver is himself a Momin, this somewhat suspicious and exceedingly conservative class, who form a strong section of the weaving population in Nagpur, would be more ready to give those looms a thorough trial if they were erected in the master-weaver's house. For some days they evinced considerable interest. Two or three of them were induced by the payment of a low wage to put in several days consecutive labour.

The treadle mill proved the least acceptable both because the mechanism worked less smoothly and because the unaccustomed use of the legs soon tired the weavers. Some of the Momins eventually admitted that the border cloth fly-shuttle loom gave a much larger outturn than their old hand looms and that the quality of the cloth left nothing to be desired. Nevertheless they would not agree to take up the matter seriously and set up fly-shuttles in their houses. I have been credibly informed that the reason for this apparent want of enterprise is a suspicion that K. B. Dadabhai Bezonji Mehta, the Manager of the Empress Mills, is only interesting himself in the matter, in order that he may learn from them how to make the bordered cloths which are woven on the hand-looms of Nagpur, but cannot be exactly reproduced on power looms. I think we must give up the attempt for the present in Nagpur. But there are other fields to which attention has already been turned, and I hope that some success will be achieved

during the current year. In Seoni three members of the District Agricultural and Industrial Association combined in an attempt to introduce the fly-shuttle into that town, but without success. The extraordinary results attained in the Jubbulpore and possibly other jails place it beyond dispute that with a fly-shuttle on Mr. Date's principle, the weaver can double his outturn. The cost of all the extra parts required is about Rs. 11. Weavers are amongst the most conservative of Indians and it may take some years before the fly-shuttle is used on a commercial scale, but some day an enterprising master weaver will be found who will introduce it to his workshop and undersell his fellows. It will not then be long before it comes into general use.

Conclusion.

43. Mr. Joshi rendered yeoman service during the year. His practical knowledge of agriculture and enthusiasm for his work command the respect of the agricultural classes. His services in the cause of agriculture were recognized by the grant of the title of Rao Bahadur.

The department benefitted much by the advice and assistance of Mr. J. W. Mollison, Inspector-General of Agriculture.

I have the honour to be,

Sir,

Your most obedient Servant,

B. P. STANDEN,

Director of Agriculture.

Statement showing the number of Agricultural Stock in each District of the Central Provinces and Berar during the Agricultural year ending the 31st May 1904.

Statement showing the number of Agricultural Stock in each District of the

	Districts.	Bulls and bullocks.	Cows.	Male buffaloes.	Cow buffaloes.	Young stock (calves and buffalo calves.)
	1	2	3	4	5	6
		No.	No.	No.	No.	No.
Jubbulpore Division.	Saugor	130,042	141,990	3,288	66,653	181,066
	Damoh	102,761	97,057	3,337	37,901	99,951
	Jubbulpore	186,724	131,224	9,383	47,330	166,905
	Mandla	107 306	130,827	7,262	26,529	60,986
	Seoni	126,680	99,042	10,042	28,996	64,510
	Total Jubbulpore Division ...	653,513	600,140	33,312	207,409	573,418
Nerbudda Division.	Narsinghpur	71,648	54,318	3,202	22,810	86,595
	Hoshangabad	127,444	79,503	4,594	33,240	118,591
	Nimar	102,724	74,437	3,085	29 364	67,074
	Betul	111,353	76,087	3,321	16,939	98,865
	Chhindwara. Khalsa	131,739	101,345	3,801	25.571	94,411
	Chhindwara. Jagirs	21,485	24,349	607	5,486	26,178
	Total Nerbudda Division ...	566,393	410,039	18,610	133,410	491,714
Nagpur Division.	Wardha	131,055	77,113	4,029	31,023	62,920
	Nagpur	222,112	142,056	6.236	35.585	119,302
	Chanda ... Khalsa	149,816	157,786	11,141	35.187	86,068
	Chanda ... Zamindari	35,311	49.504	6,857	5,012	39,332
	Bhandara ... Khalsa	106,631	101,176	15,559	24,742	69,317
	Bhandara ... Zamindari	52,802	39,316	11,083	4,681	25,992
	Balaghat ... Khalsa	67,392	56,001	14,266	8,047	36,585
	Balaghat ... Zamindari	19,211	16,278	4.071	2,141	13 804
	Total Nagpur Division ...	784,330	639,230	73,242	146 418	453,320
Chhattisgarh Division.	Raipur ... Khalsa	394 977	281 971	74,378	24,759	215,800
	Raipur ... Zamindari	104,489	99,337	15,266	10,682	85,250
	Bilaspur ... Khalsa	206,330	193,698	47,431	19,062	167,684
	Bilaspur ... Zamindari	93,911	103,445	17,852	6,699	92,090
	Sambalpur ... Khalsa	126,902	60,766	25,349	3,720	60,864
	Sambalpur ... Zamindari	94 344	81,851	24,675	5.844	89,086
	Total Chhattisgarh Division ...	1,020,953	821,068	204 951	70,766	710,774
	TOTAL FOR THE C. P. ...	3,025,189	2,470,477	330,115	558,003	2,229,226
Berar.	Akola	118,457	37,823	4,476	19,552	27,761
	Amraoti	128,366	56,144	2,276	40,084	48,469
	Basim	95,930	72,201	2,362	24,918	35.741
	Buldana	118,774	43,727	4,503	22,207	40,747
	Ellichpur	57 489	26,139	2,672	12,756	13,624
	Wun	88,464	196,179	2,058	92,250	30,009
	Total for Berar ...	607,480	432 213	18,347	211,767	196,351
	GRAND TOTAL C. P. AND BERAR ...	3,632,669	2,902,690	348 462	769,770	2,425,577

Central Provinces and Berar during the Agricultural year ending the 31st May 1904.

Sheep.	Goats.	Horses and ponies.	Mules and Donkeys.		Camels.	Plough-cattle (included in cols. 1—5).	Ploughs.	Carts.	Total of Cols. 1—12.
			Mules.	Donkeys.					
7	8	9	10	11	12	13	14	15	16
No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
16,119	23,180	8,583	304	1,326	6	103,435	46,629	14,625	572,557
14,596	27,928	4,709	18	1,863	6	81,512	39,692	6,067	390,127
15,365	39,574	10,276	116	536	12	196,107	75,597	5,300	607,445
1,754	9,363	4,314	5	25	...	81,157	38,688	1,494	348,371
2,468	17,000	5,147	16	167	6	113,179	40,639	16,887	354,074
50,302	117,045	33,029	459	3,917	30	575,390	241,245	44,373	2,272,574
6,383	29,033	6,222	45	2,984	8	62,454	28,829	13,598	283 248
8,328	33,848	3,925	74	1,953	178	114,123	36,925	29,157	411,678
1,395	35,028	2,224	5	1,217	4	86,102	31,865	24,283	316,557
4,708	45,624	4,822	...	483	7	94,623	35,822	14,872	362,209
5,966	56,411	7,217	9	825	11	113,218	41,904	23,271	427,306
1,004	5,115	1,185	1	32	6	17,567	9,031	625	85,448
27,784	205,059	25,595	134	7,494	214	488,087	184,376	105,806	1,886,446
17,214	69,341	2,773	1	2,564	2	193,975	20,224	30,613	398,035
43,950	124,325	4,221	26	1,663	22	186,160	52,913	43,483	699,498
59,340	86,852	1,764	2	105	...	135,301	49,234	30,865	588,061
480	13,074	221	...	...	...	31,083	14,599	7,045	149,791
6,050	121,363	1,483	...	144	...	317,425	61,116	41,718	446,465
131	16,026	509	5	...	...	133,874	26,483	20,116	150,545
92	14,127	869	...	...	...	70,674	33,512	18,838	197,379
72	5,709	323	...	...	...	20,241	9,342	4 389	61,609
127,329	450,817	12,163	34	4,476	24	1,088,733	267,423	107,067	2,691,383
46,540	69,693	8,357	...	44	...	991,883	128,151	46,533	1,116,519
10,759	20,696	1,793	...	2	4	315,024	39,351	10,246	348,278
15,949	44,331	6,803	...	3	...	253,761	82,881	17,546	701,291
1,830	31,902	2,687	...	33	1	111,763	38,062	10,485	350,450
9,360	18,160	845	...	33	...	146,759	73,205	9,838	305,999
7,285	31,159	752	...	...	...	113,853	55,527	14,346	334,996
91,723	215,941	21,237	...	115	5	1,933,045	417,177	108,994	3,157,533
297,138	988,852	92,024	627	16,002	273	4 085,255	1,110,221	456,240	10,007,936
23,626	113,021	3,353	1	4,372	30	208,069	8,546	33,162	352,472
62,909	103,454	4,116	2	3,597	45	275 339	11,696	40,174	449,462
15,035	58,317	2,809	...	1,522	46	176,544	20,991	13,161	308,881
66,498	81,179	5,458	...	2,885	25	229,958	14,575	21,622	386,003
11,913	49,906	1,876	...	1,952	35	55 523	8,848	17,048	178,362
38,108	86,819	3,890	...	1,818	8	408,960	27,042	27,251	539,603
218,089	492,696	21,502	3	16,146	189	1,354,393	91,698	152,418	2,214,783
515,227	1,481,558	113,526	630	32,148	462	5,439,648	1,201,919	608,658	12,222,719

ANNEXURE A.

List of Agricultural Implements which have been tested in the Central Provinces during the year ending 31st March 1904.

No.	Name.	Use.	Special advantage.	Price.	Where procurable	Opinion of official reporter.	Extent to which used by native agriculturists.
				Rs. a. p.			
1	*Swedish Plough* ...	Ploughing and inverting the soil.	Efficiency in ploughing and inverting the soil, especially in breaking up grass lands.	16 0 0	Ankerbank's Red Shop and Company, Olsverums, Sweden.	A most useful plough for black soil. Has continued to do very good work on the Nagpur Farm.	A considerable number has been sold by the Nagpur Farm.
2	*Mayfürth's Hand-Thresher.*	Threshing any crop except juar.	Cheapness and rapidity in threshing crops.	199 0 0	Mayfürth and Company, of Frankfort-on-Maine, Germany.	A useful instrument ...	Has not been taken up by native cultivators.
3	*Macarthy Hand Cotton Gin.*	Ginning cotton ...	Rapidity in ginning and saving of labour.	220 0 0	Messrs. N. D. Maxwell and Company, Bombay.	An excellent small gin which works satisfactorily and does not injure the seed.	Do. do.
4	*Poona 3-roller Iron Sugar Mill.*	Sugarcane crushing ...	A copy in iron of the ordinary wooden mill, which is easily worked and very efficient.	160 0 0	Superintendent, Experimental Farm, Poona.	Simple in construction and strong, Strongly recommended.	One has been sent to Betul District
5	*Poona Evapsrating Sugar Pan.*	Preparing gur from sugarcane juice.	A shallow pan of improved shape.	30 8 0	Do. do. ...	Strong. Highly recommended ...	One has been sent to Betul.
6	*Fanning Mill* ...	Winnowing all varieties of grain.	Easily worked by hand; gives large outturn and separates grain from husk and dirt.	136 0 0	Harder and Company, Empire Agricultural Works, Cobleshill, New York.	The best winnower yet tried ...	Native cultivators are commencing to ask for this machine, which allows them to winnow grain without waiting for a breeze.
7	Marvin-Smith's round-about gear, two-bullock power.	Working all kinds of agricultural machinery.	A useful power machine easily worked with bullocks.	210 0 0	Messrs. Marvin-Smith and Company, United States, America.	Recommended ...	A few have already been sold.
8	Marvin-Smith's four-horse power round-about bullock gear.	Do. do. ..	A more powerful machine ...	320 0 0	Do. do. ...	.....	Two have been ordered in the Nagpur and one in the Chhindwara District.
9	Bucket Pump ...	Spraying fruit trees with insecticides and fungicides.	A fairly efficient spraying machine.	10 0 0	America ...	Works well ...	.....
10	Perfection sprayer ...	Spraying small plants ...	A very cheap sprayer ...	2 8 0	Do. ...	Works satisfactorily ...	Many have been sold.
11	Granger seeder ...	Broadcast sowing of seed.	Sow seed broadcast over a large stretch of land.	10 0 0	.....	Requires practice to work evenly...	Seven have been sold in Seoni.

List of Agricultural Implements which have been tested in the Central Provinces during the year ending 31st March 1904.—(Contd.)

No.	Name.	Use.	Special advantage.	Price.	Where procurable.	Opinion of official reporter.	Extent to which used by native agriculturists.
				Rs. a. p.			
12	*Fodder cutter and shredder.*	Cutting juar stalks into short pieces.	Rapidity in cutting juar stalks (karbi) into small lengths, the whole of which cattle are able to consume.	215 0 0	Harder and Company, Empire Agricultural Works, Cobleshill, New York.	A very useful implement for cutting juar stalks into quarter-inch bits, which cattle eat with great ease. It effects a great saving in fodder as nothing is wasted. It cuts very fast and is easy to work. A man working at the machine for half-a-day can produce chopped food for 30 head of cattle. It is also a very good machine for chopping maize stalks. A very sweet sillage can then be prepared out of this material that would otherwise be wasted.	A considerable number have been sold at the Nagpur Farm.
13	Hand-fodder chopper ...	Do. do. ...	Do. do. ..	15 0 0	Messrs. Marvin-Smith and Company, America.	A useful hand implement for a small cultivator.	A demand has already arisen, but it is simply because it is cheap. In my opinion it is of no use.
14	*Cooke's turn-wrist plough.*	Ploughing and inverting the soil.	Has the special advantage of working along the furrow in both directions.	72 0 0	Cooke and Sons, England.	A very strong plough which gives work equal to the Swedish plough No. 1 and has the additional advantage of working along the furrow in both directions. It gave excellent results in breaking up waste land, but its price is too high for native cultivators.	
15	Kent's corn planter ...	Sowing maize ...	Dibbling can be done very efficiently.	5 0 0	Messrs. Marvin-Smith and Company, United States of America.	Works fairly well.	
16	Mathews' combination drill, double-wheel with hoe.	Sowing and hoeing the crops of very small areas.	Man works this machine. The difficult attachments for sowing, hoeing, raking, and ploughing can be fixed when the operator wants it.	35 0 0		A useful implement for sowing and weeding kharif crops, but is more suitable for garden than field work.	Nine have been ordered for District Gardens.
17	*Corn sheller* ...	Shelling maize.	Separates the seeds from the cob very efficiently without injuring them.	10 0 0		A useful little instrument that saves much labour.	Five have been sold in Wardha.
18	Diamond hay press ...	Baling grass ...	Presses compact, handy bundles of hay. Worked by bullock power.	625 0 0	Marvin-Smith & Co., of America.	Much better than the presses worked by manual power. Can press 20,000 bales in one day with the help of 3 men, 2 women and 2 bullocks.	Has not yet been taken up by cultivators.

19	*Junior feed-cutter* ...	Cutting juar stalks into short pieces.	Rapidity in cutting juar stalks (karbi) into small lengths, the whole of which cattle are able to consume.	35 0 0	Marvin-Smith & Co., of America.	A useful hand implement for a small cultivator, much better than No. 13.	Demand has already arisen, but it is a very weak machine and if it were carelessly handled, it is sure to go out of order in a short time.
20	*Tread power* ...	Working all kinds of agricultural machinery.	A useful power machine easily worked by bullocks, which require training in the beginning.	600 0 0	Harder & Co., Cobbleshill, New York, America.	A useful machine on the farm worked by two bullocks. Bullocks have only to walk upan inclined plain to work it, unlike as in Nos. 7 or 8, where they have to exert a dragging strain in pulling horizontally. A machine not intended for ignorant cultivators.	Not yet taken up by cultivators.
21	Harder's round-about four-horse gear.	Do. do. ...	Same as No. 8 ...	283 0 0	Do. do. ...	Stronger in make than No. 8 ...	Two have been ordered in Nagpur. Worth recommendation.
22	*Harder's thresher* ...	Threshing any crop except juar.	Rapidity in threshing crops. Worked by tread power only. No. 20.	225 0 0	Do. do. ...	Excellent worker. Requires two horse power.	Not yet taken up by cultivators as it can be worked very easily by tread power only.
23	*Cooke's cultivator* ...	Scarifying the soil ...	Very useful to up root the stumps of juar and cotton crops.	60 0 0	Cooke and Son, England.	Recommended to be worked in fields which are overgrown with many weeds and which have many stumps.	Not yet taken up. It is really a very useful implement if the cultivators were to know its advantages. The assistant Director has had no opportunity to show its working. This implement is very useful for preparing the ground for rabi although overgrown with any kind of weeds. But the cost is high.
24	*Ransome's turn-wrist plough.*	Ploughing and inverting soil.	Same as No. 14 ...	47 0 0	Ransome and Sons, England.	Same as No. 14 ...	Two in Hoshangabad, one in Berar. one in Nagpur have been sold. They are really good implements worth trying in breaking up new land as well as deep ploughing in the hot weather. A competition was held in Berar at Malkapur to prove the advantages of it over the country plough worked by 2 or 3 pairs of bullocks. The plough was winner in the competition.
25	Portable tool-grinder ...	Sharpening the edges of tools.	A nice handy machine for sharpening scythes and other agricultural tools.	11 0 0	Marvin-Smith and Co., America.	Recommended to cultivators and carpenters.	One has been ordered in Nagpur.

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APPENDIX B.

REPORT OF THE SUPERINTENDENT, CIVIL VETERINARY DEPARTMENT.

REPORT

ON THE WORKING OF THE

CIVIL VETERINARY DEPARTMENT

OF THE

CENTRAL PROVINCES

DURING THE YEAR ENDING 31ST MARCH

1904.

No. $\frac{4380}{119}$.

FROM

B. P. STANDEN, ESQ., I.C.S., C.I.E.,

COMMISSIONER OF SETTLEMENTS AND AGRICULTURE,

Central Provinces,

TO

THE CHIEF SECRETARY TO THE HON'BLE THE CHIEF COMMISSIONER,

CENTRAL PROVINCES,

Revenue Department.

Nagpur, the 26th August 1904.

SIR,

I have the honour to forward the Annual Report on the work of the Civil Veterinary Department for the year ending the 31st March 1904. The report was not received in my office till 4th August. The Superintendent ascribes the delay to an insufficient office establishment, and I am in correspondence with him on this subject. On the 12th January 1904 the Berar establishment was placed under Mr. Jethiji's orders.

2. The horse and mule-breeding establishments were closed during the year in compliance with orders received in the preceding year.

3. Three new dispensaries were opened in the Central Provinces and five in Berar during the year, making a total of 12 in the Central Provinces and 17 in Berar. Since the close of the year the Berar establishment has very nearly reached the standard declared necessary by the Government of India orders. The number of dispensaries in that part of the Province will be sufficient when one more has been opened; there will then be one in each taluk. But it is doubtful wnether the sanctioned scheme provides as many Veterinary Assistants as are required. Each dispensary has one Veterinary Assistant, and those Veterinary Assistants who are posted at large towns are unable to tour in their taluk as much as is desirable. In the Central Provinces several districts are still entirely unprovided with a Veterinary Assistant. I hope that with the advent of better times Local Bodies may be able to afford to be more liberal to the Department. The total number of patients treated increased during the year, and in Berar the increase is more than proportionate to the increase in the number of dispensaries. In the Central Provinces although the total figures do not indicate that veterinary treatment is any more popular than it was, analysis of the statistics shows that last year's total was swelled by a large number of foot and mouth cases in one district, and there has been an increase in the number of miscellaneous cases treated per dispensary. Horses and dogs and other domestic pets form a large proportion of the total. Only an insignificant number of animals are brought to the dispensary for treatment from beyond municipal limits; and it would certainly be equitable to throw a large share of the charges on to the Municipalities; only five contribute at present, and except at Wardha and Ellichpur their contributions fall short of the sums which might justly be demanded from them. Under existing arrangements if the full staff of two Veterinary Assistants is entertained, one remains at the Dispensary and is used almost

solely by residents of the Municipality, while the other goes on tour. If the Municipal Committee paid for the Veterinary Assistant who remains at head-quarters, District Councils would at once be able to considerably increase the establishment of peripatetic Assistants.

4. It is satisfactory that Veterinary Assistants in the Central Provinces accomplished more touring during the year under report. There were six peripatetic Veterinary Assistants and they visited 1,618 villages and treated 10,912 cases as against 795 and 5,738 in the preceding year. In Berar, where there were 27 Veterinary Assistants, all of whom were more or less tied to the dispensary, only 517 villages were visited and 2,624 animals treated. Out of the total number of 13,536 cases treated in the villages, 10,783 were attacked by epidemic disease. Foot and mouth disease alone accounts for 9,812. The mortality in this disease is always small. If the percentages of Table M are reliable, the percentage of mortality in cases of epidemic disease treated by Veterinary Assistants would not appear to be any lower than is usual in this country, except in the 32 cases of black quarter treated with Mr. Jethiji's prescription. The mortality amongst these cases was only 31 per cent. as against 75 per cent. on the cases detailed in Table M. Possibly the delay which usually occurs in informing Veterinary Assistants of outbreaks may be partly responsible for this want of success. It often happens that the epidemic has disappeared by the time the Veterinary Assistant arrives on the scene. My predecessor directed that rinderpest outbreaks should be reported by wire to the Superintendent, but in the case of other diseases the Veterinary Assistant on the spot is informed by the Secretary, District Council, the report previously passing from the local official (Patwari, Revenue Inspector or Police Officer) through Tahsildar to Deputy Commissioner. Some statistics bearing on this subject are being collected, and I hope it may be possible to improve matters. The most satisfactory feature in the report is the increase in the number of inoculations against rinderpest : 1,355 animals in six districts of the Central Provinces and 468 in one district of Berar were inoculated during the year with satisfactory results. As soon as cattle-owners were convinced by ocular demonstration that the operation did not prevent the cattle from working, they made no objections. The most useful item of work which Mr. Jethiji can take up at present is the field training of Veterinary Assistants in inoculation. My predecessor referred to this subject in detail in paragraph 3 of his letter forwarding the Report for 1902-03. There are now 16 Veterinary Assistants in the Central Provinces, who have been through the course at Muktesar, and of these 7 have been trained by Mr. Jethiji in the practice of inoculation. In Berar the two Veterinary Inspectors have been trained at Muktesar, but no Veterinary Assistants. Arrangements are now being made to send some of the latter to Muktesar. This year the Superintendent is going to summon to outbreaks all untrained Veterinary Assistants within reach and not only those posted to the district in which the outbreak occurs. In this way the training should proceed more rapidly. The Superintendent reports that cattle-owners are beginning to understand the advantages of segregation and proper disposal of the carcases of animals which die of epidemic disease. But he complains of the opposition of kotwars to the latter operation. In most districts the Deputy Commissioner has power under the wajib-ul-arz to prevent kotwars from taking the hides of infected animals and the Superintendent should find out what are the terms of the wajib-ul-arz in each district in this respect and instruct his Veterinary Assistants accordingly. The report also remarks on the indifference of the subordinate revenue officials to the Veterinary Department. Tahsildars, their Naibs and the Land Record Staff can materially assist Veterinary Assistants by expediting reports of epidemic disease, not only by passing them on without delay, but by impressing on the people, when on tour, the necessity for prompt report directly the first case appears. They can also do much to further the ends of the Department by speaking to cattle-owners on the subject of rational cattle management.

5. The two Government cattle-breeding farms at Telinkheri and Powarkheda are in satisfactory order. Mr. Jethiji would substitute the Sanka for the Malwi breed at Powarkheda. In this I cannot agree with him. I do not know this breed, but I gather from the report that they are larger and heavier than the

Malwi. The Malwi is, in my opinion, quite the largest breed which could be usefully crossed with the cows found in the north of the Provinces and anything heavier would be too large to give satisfactory results Since the close of the year the question of bull-rearing establishment has come under consideration. One of the Agricultural Assistants is about to be lent to manage the herd of Gaolao cattle maintained by the Jaitpur estate on the borders of Nagpur and Chhindwara, and Mr. Napier has induced some wealthy inhabitants of Raipur to subscribe towards the establishment of a breeding-farm near that town. I understand the capital is subscribed, the association registered under Act X of 1860 and the site acquired.

6. Mr. Jethiji manifests a lively interest in his work, and the Department has certainly made some progress in the past year.

I have the honour to be,

SIR,

Your most obedient servant,

B. P. STANDEN,

Commissioner of Settlements and Agriculture.

No. 720-12.

FROM

J. S. JETHIJI, ESQ., M.R.C.V.S.,

SUPERINTENDENT, CIVIL VETERINARY DEPARTMENT,

Central Provinces,

To

THE DIRECTOR OF LAND RECORDS AND AGRICULTURE,

Central Provinces.

Nagpur, the 4th August 1904.

SIR,

I have the honour to report upon the working of the Civil Veterinary Department during the year ending the 31st March 1904.

2. I held charge of the post of Superintendent, Civil Veterinary Department, throughout the year except for the short period, 1st March 1904 to 3rd May 1904, when I was on privilege leave, and Mr. J. Hullah, I.C.S., Assistant to the Commissioner of Settlements, performed the current duties of the office.

I & II.—HORSE AND MULE-BREEDING.

3. Horse and mule-breeding operations were discontinued under the orders of the Government of India, contained in Revenue and Agriculture Department letter No. $\frac{1517}{82-2}$, dated the 25th August 1903, to the address of the Honourable the Chief Commissioner. Consequently there is nothing of importance that I need mention under this head.

Horse Stallions.

4. The stallions were sold by public auction at Jubbulpore on the 30th of October 1903, and the sale-proceeds, amounting to Rs. 606, were credited into the Treasury, *vide* Table H.

5. The general average cost of feed and keep per stallion during the time they were kept by the Provincial Government was Rs. 189, *vide* Table E.

6. The total number of mares covered during the time they were kept by the Government is 65. Out of this number, 40 were covered by the Saugor stallions, 18 by the Narsinghpur stallion and 7 by the Damoh one, *vide* Table D.

7. The results of previous year's coverings have been returned as 19, or an average of 4·75 per stallion; the number not known is 45, *vide* Table D.

Donkey Stallion.

8. The cost of feed and keep of the donkey stallion was Rs. 154-13-6

9. Twenty-four mares were covered by the donkey stallion. The number of foals produced by the previous year's coverings has been returned as 1, the number not held and not known as 18, *vide* Table J.

10. The stallion was sold for Rs. 50, *vide* Table H.

III.—Cattle-disease—Investigation and Prevention.

(1) *Information collected.*

11. No new disease came under my observation during the year besides those mentioned in last year's report.

It is gratifying that the people have, at least to some extent, realised the seriousness of contagious diseases, and that in some parts they have to check the spread of these diseases, willingly adopted the important remedial measures, *viz.*, segregation and the disposal of carcases. This knowledge is anything but general, but its diffusion, even to a small extent, is to the credit of our peripatetic Veterinary Assistants, who have in this direction worked better during the year than in any preceding. I believe that combined with other reasons, it is owing to a want of zeal on the part of the people that these measures are not more widely adopted. We have, as yet, to fight against the in-born prejudices of the still, in many respects, unenlightened native, who, by nature, is slow in accepting scientific theories and giving them a fair trial. We can only by practical demonstrations succeed in such matters. It is, therefore, of importance that more peripatetic work should be done than in the past. We want a larger number of Veterinary Assistants and much more assistance than we have heretofore received from District officials other than those stationed at the District Headquarters.

The students of the Nagpur Agricultural School, who have received instructions in veterinary science, can, if they wish, be powerful co-workers with the Veterinary Department. The Revenue Inspectors of Sakoli in Bhandara and Katangi in the Balaghat District have proved exceptions to the general rule by their active interest in the work, and I have no doubt that their confreres would, if they are approached, follow the good example with advantage to themselves and the Administration. It is regretable that, in many districts, carcases are not properly disposed of. Kotwars object to the burying of hides, and they naturally do, because it means a loss to them. The malicious destruction of cattle by the administration of arsenic is not an uncommon practice in these Provinces and the object is apparently to obtain their hides. I should think that if a penalty were enforced, the carcases of cattle dying suddenly or of contagious diseases would be properly buried. Some restriction should also, I think, be placed on the sale and handling of arsenic.

12. I am pleased to be able to say that greater confidence is now placed in our Veterinary Assistants, and this is apparent, as the number of cattle treated this year is almost doubled the number treated last year. A large number of people now seek medicinal aid. I have noticed, however, that the people to a large extent still hold off, in operation cases, a fact which proves the need for more Veterinary Dispensaries. Serious operations can only be performed, with any degree of success, in a well-equipped dispensary. Our peripatetic Veterinary Assistants are much handicapped for want of equipments. I am endeavouring to get them supplied with the most commonly required instruments, and when this is done, we may look forward to good results.

(2) *Outbreaks during the year.*

13. As the result of instructions issued by the Director of Agriculture, at my request, reports of outbreaks of cattle diseases were more promptly and regularly received during the year than in the previous years. I find from a register maintained in my office that there were 79 outbreaks of rinderpest, 324 of quarter evil, 231 of malignant sorethroat, 19 of anthrax and 261 of foot

and mouth disease. These figures, though they may not illustrate the actual state of things, show clearly that cultivators suffer considerable losses through the death of their cattle. These losses should be considerably minimised by the prompt reporting of outbreaks, which would ensure immediate veterinary relief. I appeal to the District authorities for their assistance in this matter.

The practice in Berar of reporting all deaths of cattle ought, I think, to be adopted in the Central Provinces; by this practice it is possible to keep a proper check over the persons responsible, At present there is no standing order even to maintain a register of deaths of cattle from contagious diseases, unless special orders are issued at the time. The matter is of utmost importance, and I trust it will receive consideration.

Rinderpest.

14. *Rinderpest* was prevalent chiefly in the districts of the Nagpur and Chhattisgarh Divisions. The Northern Districts remained unaffected since the outbreak in the previous year at Murwara was stamped out by inoculation. The disease prevailed more vigorously in the rainy and cold seasons, and with the limited staff of Veterinary Assistants it was difficult to combat it as satisfactorily as may have been expected. This was particularly the case in the Chhattisgarh Division, where, owing to the nature of the country and the magnitude of the districts, very little travelling could be accomplished during the rains. Raipur and Bilaspur have each one touring Veterinary Assistant, whilst Sambalpur has none at all. In the Chhattisgarh Division alone, 40 outbreaks occurred, whilst in the Nagpur Division, Nagpur reported 21 and Wardha 13.

It is a pity that the two districts, *viz.*, Nagpur and Wardha, in which the best cattle are to be found, have been so subject to visitations of this dreadful epidemic. Apparently outbreaks are more regularly reported from these districts, especially from Wardha, than from others. These frequent outbreaks in the two districts named should have been more satisfactorily checked had it been always possible to afford immediate veterinary relief. I was, on the occasion of some outbreaks, touring in distant districts and could not therefore be present. The itinerating Veterinary Assistant of Nagpur was ill for some time, and the man in the Wardha District was not trained in the methods of inoculation. Consequently the duty devolved on more occasions than one on the Veterinary Assistant attached to the Dispensary, who, for many apparent reasons, could not always be very punctual in attendance.

15. If the subordinate veterinary staff were provincialised (a proposal I have in contemplation to bring before the Administration), it would be much easier for me to order out Veterinary Assistants at any time, I may wish to, without prejudicing the demands of the public upon the Head-quarters Dispensary and with advantage to the community stricken with disastrous cattle epidemics.

Ektangya (Quarter Evil).

16. *Ektangya* (*Quarter Evil*).—Throughout the Provinces, there were 324 outbreaks of this deadly epidemic. With the exception of some parts of Berar, it prevailed to the largest extent in the Northern Districts, particularly in Seoni, Saugor and Betul.

17. It is a matter of much regret that there are no Veterinary Assistants at Betul, either at head-quarters or for itinerating purposes. It is high time I think that the Local Boards in this district waked up to see their way towards fulfilling their responsibilities to the public which suffer no small losses, from year to year, from cattle diseases.

Veterinary work has also suffered in Seoni for the want of a peripatetic Veterinary Assistant, who is most urgently required. I think also that for a large and important district like Saugor more than one itinerating Veterinary Assistant is required, and I trust that this matter will receive consideration. There has, in the past, been considerable remissness in reporting outbreaks of contagious diseases among cattle, especially in the case of *ektangya*, which, being of short duration, it is essential that veterinary assistance should be immediately given.

To study the nature of this disease, I had requested that outbreaks may be reported to me by wire from the Tahsil Head-quarters whenever the disease made its appearance anywhere near the Railway. But in spite of this no timely report was received by me, although during the last monsoons I remained touring in the Northern Districts for over two months. Consequently, I regret I am unable to give any definite opinion as to its exact nature. However, to keep myself well informed of the outbreaks of this disease, I have introduced a practice in accordance with which Veterinary Assistants submit to me a detailed special diary of the number of outbreaks they have attended and the results, etc. Later on, towards the end of the rainy season, I was thus able to send out some special medicine, to be tried on this disease. The results, which at present appear to be somewhat satisfactory, are shown in the table given below :—

NUMBER OF ANIMALS TREATED.				CURED.				Remarks
Up to 3 years old.		Above 3 years old.		Up to 3 years old.		Above 3 years old.		
Buffaloes.	Cattle.	Buffaloes.	Cattle.	Buffaloes.	Cattle.	Buffaloes.	Cattle.	
...	14	1	17	...	8	1	14	Out of the 9 cases that died, five animals had not received the medicines exactly according to the instructions given. To some, it had been given rather too late.
	32				23			
	72%							

The largest quantity of this medicine was used by Veterinary Assistant Abdul Gani Khan of Saugor, who had taken much pains over obtaining the results. In this connection, I have to thank Mr. Chapman, Deputy Commissioner of Saugor, for the interest he has taken in securing prompt action. The medicine was sent to some other districts, but the results have as yet, I am sorry, not been received.

Foot and mouth disease.

18. *Foot and mouth disease* was prevalent throughout the Provinces, but in a milder form than in preceding years. The treatment of such cases has been attended to with much success by peripatetic Veterinary Assistants during their tours. This disease, I noticed in Mandla, is carried from one place to another by the Banjaras' pack-bullocks. Diseased cattle are also often brought to religious fairs and markets, where the infection readily spreads. I have impressed on Veterinary Assistants the necessity of visiting all fairs and markets wherever, in the course of their tours, it is possible to do so, and to take immediate action to check the spread of contagious diseases where they may exist.

Anthrax.

19. There were 250 outbreaks reported under the symptoms of anthrax; of these only one, which occurred in the Nagpur District, turned out to be an outbreak of real anthrax. I attended the scene of outbreak as soon as possible after the receipt of a report from a private source. The disease was checked promptly and no more than two cases occurred. I sent up a culture specimen to Dr. Lingard, who kindly examined it and declared it to be a real case of anthrax.

(3) *Treatment, Vaccination, etc., etc.*

20. During the year 8 Veterinary Assistants were trained at the Imperial Bacteriological Laboratory in the method of anti-rinderpest inoculation.

21. In ten out of the twenty-seven villages in which inoculation was carried out, I introduced the system by practical demonstration and inoculated 259 animals, out of which 2 were attacked and 1, which I am strongly of

opinion was affected before inoculation, died. With this doubt in my mind, I have thought it very desirable to instruct Veterinary Assistants to inoculate only the perfectly healthy cattle (showing no sign of dullness whatever), as it is most probable that if an animal already diseased is inoculated and die soon after, the treatment will become unpopular with cattle-owners, who are always ready to find fault with our methods of treatment.

Altogether 1,355 cattle were inoculated during the year as against 117 in the last. Of this number only 4 died. The results are satisfactory. The two Assistants who have shown great keenness and interest in this new method of treatment are Shridhar Maroti Rao of Wardha and Gaurishankar of Bilaspur. The former has been particularly successful in getting good results.

22. The difficulty experienced in the past in getting sufficient quantities of serum from the Imperial Bacteriological Laboratory does not now exist. The experimental pit opened out at the Nagpur Agricultural School under the orders of Mr. F. G. Sly, late Director of Agriculture, has proved very successful, and a sufficient quantity of serum is now always available. During the month of May 1903 the Veterinary Inspector (Mr. Khandkar) of Berar attended an outbreak of rinderpest at Pusad with success. This was the first occasion on which inoculation was attempted in Berar.

23. Anthracoid diseases, malignant sorethroat, and quarter-evil prevailed to a large extent, but as these diseases appear and abate so quickly, it was difficult to treat them adequately, with a limited staff of Veterinary Assistants, either by inoculation or vaccination.

IV.—Cattle-breeding, including Cattle Fairs.

(1) *Cattle-breeding.*

24. The Nagpur Cattle-breeding Farm thrives well under the management of the Assistant Director of Agriculture. The stock has increased from 47 in the previous year to 75 in the year under report, the addition of 28 being due to births. An increase in the stock has necessitated extensions to the existing buildings. The grazing area is now fenced with wire and an intermediate line of fencing has been made in order to separate male stock from the cows; and a separate corrugated iron building has been erected on an adjoining hillock for keeping the weaned male stock.

An outbreak of foot-and-mouth disease occurred at the Farm in last December. But timely notice was given to the Veterinary Inspector (Mr. Deosthalay) of the Nagpur Dispensary, who took immediate steps and stamped it out by segregating the two affected calves in a temporary shed at a distance of 300 yards from the main building. Thus the disease was nipped in the bud and had no chance of spreading. So far the breeding farm at Nagpur has apparently done well, and I have every hope that with perseverence and care, the object in view will be secured within a few years. We shall, in time, have a goodly number of excellent breeding bulls which could be distributed over the Province with very good results.

25. Another breeding farm has been established at Powarkheda in the Hoshangabad District. This farm is stocked with 46 cattle of the Malwi breed obtained from Indore. The object of the Powarkheda Farm is to introduce the Malwi breed into the Northern Districts of the Provinces, in which it is said that the Gaolao does not thrive as well as it does in the Nagpur country. We can, I think, with no feelings of doubt, look out for good results from this experiment under the able supervision of Rai Bahadur R. S. Joshi, the Assistant Director of Agriculture.

In speaking of the success of the Farm, I refer mainly to the introduction of the pure Malwi breed into these districts, but I am personally of opinion that it would be of greater advantage to improve the breed of the so-called Sanka cattle, which are stronger and better suited for work in the black-soil fields of the Nerbudda Valley.

26. From the information I have gathered during my tours, I find that there is practically no community, in the districts I have travelled through, which has endeavoured to breed cattle true to type on any good principle. The Gaolis are the only community which go in for cattle-breeding, and they are to be found to a large extent in the northern tracts of Bhandara and the Khurai tracts of Seoni District. These people keep a mixed stock of cattle of the Nagpur and Gaolao breeds, and consequently do not breed true to type. These people suffer the disadvantage of not having good breeding-bulls. They obviously do not realise the importance of rearing up good bulls. I have during my tours delivered lectures on the principles of cattle-breeding and management of cattle, and have thoroughly explained the principles as opportunity offered to the leading malguzars with whom I came in contact. All Veterinary Assistants have also been instructed by me to make their best endeavours to advise the people in the course of their tours in matters connected with cattle-breeding. The ideal knowledge of the advantages of cattle-breeding on some principles can only disseminate slowly among people who, in the past, have practically taken no interest in the work. The Central Provinces offer considerable opportunities for the improvement of the breeds of cattle. The people do not, however, appreciate the endeavours of Government, and one finds much opposition in explaining to them the advantage. There is no doubt that cattle suffer in most parts of the Provinces in respect of their feed. This is especially the case in the rice-growing tracts of the Chhattisgarh country, where, from sheer want of fodder, there is much deterioration from year to year in the stamina of cattle.

This matter was very carefully enquired into by the Deputy Commissioner of Bilaspur, Mr. C. W. E. Montgomerie, and the necessity for the preservation of fodder has been realized. The first step, I think, is to ascertain experimentally which particular food may most economically be given to cattle in different tracts, and to adopt the ensilage system for the preservation of fodder where necessary. The ensilage system has proved a success wherever it was tried, and I have no doubt that the people will soon take to it if thoroughly explained to them. This I am doing.

27. It is the practice with cattle-owners in most parts of the Provinces to send their cattle when fodder becomes scarce to the grazing tracts of Balaghat and Mandla, where pasture and water is plentiful. This practice is very old, and I am told that if some Gaolao cattle were not sent there when the season arrived, they pine and even run away to Mandla. This practice of cattle gathering from different parts of the Province at one centre is open to grave objections. It offers opportunities for outbreaks of disease, and worst of all tends to the deterioration of the best type of cattle by cross-breeding which cannot under the circumstances be avoided.

28. The importance of keeping the young male calves separate from the female stock after they are weaned has been the subject of advice to almost all cattle-owners, who showed some interest in cattle-breeding, and some have showed their willingness to adopt this course very soon. In this connection, I may mention Kadu Patel, the malguzar of Malara in the Mandla District, who has set an example by enforcing this rule in his village. And I do not think that there ought to be much difficulty in doing so in other villages if the people will only interest themselves. But much good results cannot be expected till we get a plentiful supply of good bulls for distribution in the districts. An expression of my views on the question of cattle-breeding and rearing depôts has been given in this office letter No. 394-28, dated the 27th May 1904.

(2) *Cattle Fairs and Shows.*

29. I attended two cattle fairs during the year, one in Singhaji, in Nimar, and the other at Chhapara, in Seoni. As no good cattle were exhibited at either shows, no Government prizes were awarded. One rarely meets with cattle true to type in these Provinces, and the few that exist are kept for breeding purposes and are therefore not presented for sale at fairs.

30. When our cattle-breeding experiments have advanced and some good breeding bulls have been distributed over the Provinces, we may expect to see good cattle exhibited at fairs ; and, until then, I think it would be a waste of money to award prizes at shows. This money could, for the present, be better spent in cattle-breeding.

I have given detailed reasons for this opinion in my letter No. 189-11, dated the 31st March 1904, to the Inspector-General, Civil Veterinary Department, and I need not, I think, recapitulate them in this report.

V.—Veterinary Instructions.

(1) *Colleges and Schools.*

31. During the end of the year, two stipendiary students passed out successfully from the Ajmere Veterinary School.

32. The proposal to send Central Provinces students in future to Lahore where they receive instructions for three years having been sanctioned, two students were sent to that institution at the close of the year. The student, Bazlul Quadir, who was studying in the final class at Ajmere, I am sorry to mention, is reported to have died at Sambalpur in the month of April 1904.

33. Instruction in veterinary science at the Agricultural School, Nagpur, under Mr. Deosthalay, Veterinary Inspector in charge of the Nagpur Dispensary, has improved. I noticed this at the last examination, when the students evinced a good knowledge of commonly occurring cattle diseases and the methods of treatment.

(2) *Veterinary Dispensaries.*

34. In the Central Provinces, there were 12 dispensaries at work (including the temporary dispensary opened at Arvi in the Wardha District) during the year as against 9 in the year previous, and since the close of the year 4 dispensaries have been opened.

35. In Berar there were 17 dispensaries at work as against 12 in the previous year, and 4 have been opened since the year closed. With the addition of one more dispensary in the year 1904-05, the sanctioned scheme for Berar will be complete. But, if funds permit, I would advise that two Veterinary Assistants be employed at each tahsil head-quarters at Berar instead of one, as at present ; the head-quarter man cannot be employed on peripatetic duty, which is most important.

36. The new dispensaries at Bhandara and Khurai (in the Saugor District) were not opened till the close of the year, owing to the difficulty which was experienced in securing the services of qualified Veterinary Assistants. I found that Veterinary Assistants from the Punjab College cannot adapt themselves to the conditions of these Provinces, and, in one instance, a man resigned as quickly as he joined the Provinces. I have now made it binding on men taking up employments as Veterinary Assistants that they must serve at least for three years and I trust that this rule will put an end to the trouble experienced in the past.

37. I had more than once represented the inadequacy of accommodation at Veterinary Dispensaries, and I am now glad to say that the Hon'ble the Chief Commissioner has been pleased to sanction a special grant of Rs. 25,000 for expenditure in the construction and repairs of Veterinary Dispensaries. With this handsome grant and such contributions as District Councils may themselves make, we should have good dispensary accommodation at each District Head-quarters. I am ascertaining from District Councils as to what amounts they can contribute.

38. As many as 11,780 patients were treated in the Central Provinces against 9,500 in the year previous, and in Berar, 14,215 against 8,749. The large increase in the Central Provinces has occured in spite of the fact that only a few cases of foot-and-mouth disease were treated at dispensaries. This class of cases had materially raised the number treated at dispensaries last year.

The daily average attendance of bovine patients has generally increased, the increase being most marked in the Saugor and Bilaspur Districts; in the former, it was owing to the very keen interest taken by the Deputy Commissioner. In Bilaspur, Veterinary Assistant Gaurishankar has, much to his credit, secured the confidence of the people. The remaining Assistants will do well to follow this example. A dispensary can never do good work if the people can't trust the Veterinary Assistant in charge.

39. During the year, I inspected all the dispensaries in the Central Provinces, and, in the course of my inspections, I paid particular attention to the equipments. It is essential that all the dispensaries should be equally equipped, and although this may take some time, I will endeavour to arrange it. Another matter to which I paid particular attention is in respect of the stock of medicines kept at dispensaries. I have found from indents sent up for my approval that several Veterinary Assistants are apt to ask for the most costly medicines, which, as a matter of fact, are the least required in veterinary practice, and it was on this account that the expenditure on medicines in the previous year was inordinately high. I am doing my best to guard against unnecessary expenditure on medicines, and it is my intention, in future, to utilize the money so saved in the purchase of instruments, the need for which is much felt. There is much room for improvement in surgical operations and laxity must continue until our dispensaries are thoroughly equipped.

I have, as yet, not had an opportunity of doing any inspections in Berar, so that I am not in a position to say much on the state of dispensaries in that Province. I will inspect them as soon as I can this year.

On the whole, the work at Veterinary Dispensaries has been better conducted than in previous years. The prevalence of bubonic plague has generally retarded veterinary work, and indeed some dispensaries had to be closed for some time.

40. The financial position of existing Veterinary Dispensaries needs considerable improvement, and some steps will have to be taken to enforce it upon Municipalities that they must contribute towards the maintenance of the Veterinary Dispensaries from which they benefit largely. Only a few Municipalities at present contribute. I hope that the matter will receive the attention of the District authorities, and that liberal contributions will be forthcoming next year. When our finances improve, it will be possible to employ a larger number of peripatetic Veterinary Assistants than at present. There is much scope for veterinary work in the interior.

(3) *Work done by the Subordinate Staff.*

41. No Veterinary Inspection work was done by the Subordinate Staff in the Central Provinces, consequently the entire responsibility devolved on me. I find it extremely difficult to cope unaided with this large amount of inspection work, and I have, therefore, represented the need for two Veterinary Inspectors, whom I require to assist me. I have no doubt that the proposal will receive the consideration it deserves.

In Berar, two Veterinary Inspectors were employed on inspection duty, and they have done a fair amount of work, especially Mr. Khandkar, who seems an experienced and pushing man. He was very successful at an outbreak of rinderpest, where he first introduced the inoculation system in Berar.

42. The total number of Veterinary Assistants employed in the Central Provinces is shown in Table R. The increase in the number of peripatetic Veterinary Assistants is far less than is desired. We want a larger number to meet the wants of a large Province. It is not surprising, therefore, that in many parts of the Province, there are people who scarcely know of the existence and work of the Department. The itinerating Veterinary Assistants visited 1,618 villages and treated 10,912 cases during the year as against 795 villages and 5,738 cases in the year previous. Each has done a good share of work and should have done more if outbreaks of diseases were reported more promptly.

I find from statistics kindly furnished me by Mr. A. B. Napier, Deputy Commissioner, Raipur, that there were as many as 23,158 deaths among cattle during the second half of the year in that district alone from various diseases. A large number of these could have been saved had we a better staff. The mortality among cattle in the Central Provinces is very large, and these losses could be reduced to a large extent by an increase in our present staff of Veterinary Assistants. Veterinary Assistant, Dongarmal, who joined my office in July last from the Saugor Dispensary, visited 12 villages to attend outbreaks of rinderpest and did good work in introducing inoculation treatment. He accompanied me in the course of my tours and assisted me in the treatment of 104 sick animals. He has quite justified his selection and appointment to the post he holds.

VI.—Tours of Superintendents.

43. I visited 15 out of the 18 districts in the Central Provinces, the exceptions being Betul, Sambalpur and Chanda. There were no Veterinary Dispensaries in these districts to take me there, and the reports of outbreaks of cattle diseases from these parts reached me so late that I could not possibly have reached in time to check the disease. It is in the case of these outlying districts that there is the greatest need for Veterinary Assistance. Since the close of the year, two Veterinary Assistants have been entertained for Chanda, where a dispensary has been started. It was in contemplation to start a camp dispensary at Betul, but the difficulty of funds having arisen, the proposal has been dropped. I trust that the matter will receive the serious consideration of the Local Bodies, and I have no doubt that the Deputy Commissioner and the Commissioner of the Division will help with their advice. In Sambalpur, as in Betul, the funds for the maintenance of the staff and a Veterinary Dispensary are not forthcoming. Until these districts employ their full establishments, I can do little, if anything, to afford them assistance in times of serious outbreaks of cattle disease. I paid a flying visit to Chhindwara, where I found cattle disease not uncommon. There are some good cattle to be found in this district, and there is here, as elsewhere, a great need for at least two Veterinary Assistants.

44. Before proceeding on my cold-weather tour, I obtained from Deputy Commissioners information of the important grazing grounds and tracts where I could see the most and best type of cattle, so that I may form a conception of the different existing breeds and study their habits and points of identification.

A large number of cattle are to be seen in the north of Bhandara, in the Baihar Tahsil of Balaghat, in the Raigarh tract of Mandla, and in the Khurai tract of Seoni. In Bhandara, the cattle are of the mixed Nagpur and Gaolao breeds, but I noticed a few good cows well suited for breeding purposes. In Baihar, in Balaghat, where cattle from all parts meet for pasturage, I saw only few good cattle. As I have said in paragraph 27 of this report, this practice of cattle meeting for pasturage at one centre at present tends more to the deterioration than to the improvement of the good breeds of cattle. In Mandla, there are cattle of two kinds—one the small heavy-looking Banjara or pack-bullock and the other, what may be termed the true Mandla type. The latter are fine looking, generally grey in colour, and of good size. They are not, however, big-boned, and consequently less capable of hard work than the Khamarpani or Sanka cattle. They resemble the Sanka somewhat, and I believe that the pure Mandla and Sanka would produce an excellent cross. This may be attempted by some leading malguzars. I will either address the Deputy Commissioner on the subject separately or visit the district a second time. I am informed that Dindori in Mandla is a famous grazing tract, but as only a few cattle meet there in the cold weather I did not visit it.

45. In Seoni, there are a large number of wealthy malguzars who could with advantage spend a little money on cattle-breeding. The general complaint in this district is that there is not sufficient pasturage to encourage the undertaking, and there is evidence in support of this in the north of Khurai Ghat, more

especially in the stretch of country known as the "Haveli," where large tracts of land are devoted to the cultivation of wheat. Owing to the deficiency of fodder, no good cattle are to be found in this region, but on the south of the ghat, many herds of good cattle may be found in the possession of Gaolis. The cattle are of a mixed Gaolao type. I believe that if these people could be induced to be more particular in breeding good bulls, much improvement would be secured. I explained to them most carefully the advantages and principles of breeding cattle true to type, and although they showed much interest in the matter and expressed their desire for good bulls, I have little faith that they will actually take the little trouble that this most desirable improvement would impose upon them.

46. My tours during the rains were confined to the investigation of anthracoid diseases, and to the duty of impressing upon the Revenue Staff the importance of reporting outbreaks of contagious diseases promptly. Strange to say, however, that although I was on tour for over two months without a break not a single typical case of anthracoid disease came under my observation. This was due, in part, to unpunctuality in reporting outbreaks and partly to the difficulties experienced during the rains in reaching the scenes of outbreak of these diseases, which only last for a little while. I hope to be more successful during the present year in the investigation of diseases. The appended Statement P shows particulars of the number of miles I travelled, etc.

VII.—General.

47. If I may express the opinion, I believe that in spite of multifarious difficulties which had to be contended with, the Veterinary Department has made much progress during the year under report. The introduction of the scheme whereby Veterinary Assistants are now entitled to pension has considerably improved the prospects of this class of subordinate, and I have every hope that the change will invite a better class of man for the post of Veterinary Assistant than we were able to get before. I had little hope when I first joined the Central Provinces of tiding over foreseen difficulties as smoothly as we have done. There is manifestly still a great want of co-operation on the part of officials not concerned by virtue of office, with the work of the Department. Few subordinate officials apparently recognize that it is their duty to help every branch of the work of the Administration to which they owe their bread, and this is particularly the case with subordinate Revenue officials, among whom the *esprit-de-corps* obviously does not exist. I admit that many have a great deal of their own work to attend to, but there are nevertheless many possible means by which they can help the progress of the Veterinary Department more especially in the way of advice to the people.

48. Yet another grievance, which I have represented on more than one occasion, is the inadequacy of my office establishment. It is a painful task for me to have to deal satisfactorily with the great amount of incessantly increasing correspondence involved, with the limited staff of three clerks. Before the amalgamation of the Berar districts, I had only two clerks, and the addition of the clerk from Berar has, by no means, lessened my difficulties. On the other hand, since the amalgamation, which has resulted in veterinary work in Berar being put on a more thorough basis than before, correspondence from those districts has increased immensely. This is perhaps not the proper place for these remarks, which are intended more to explain the delay which has often occurred in disposing of references made to me, and especially in submission of this report.

49. My Head Clerk, Bapu Rao, has satisfactorily contended with the very heavy work imposed upon him. He has indeed done very good work for the small pay he draws.

Mr. Yakub Khan, who joined me from Berar in January last, has proved himself intelligent and useful.

Second Clerk, Narain Rao, has also worked hard, particularly during the time of my tours, when he was left alone in the office.

50. Should this report exceed the prescribed limit of print, it will be due to the few observations I have made as regards veterinary work in Berar.

I have the honour to be,

SIR,

Your most obedient Servant,

J. S. JETHIJI,

Superintendent,

Civil Veterinary Department, Central Provinces.

TABLES.

TABLE A.

PROVINCIAL REPORT.

Return of District Horse, Pony and Donkey Stallions for the official year 1903-04.

Details.	DISTRICT HORSE AND PONY STALLIONS.											DISTRICT DONKEY STALLIONS.					REMARKS.
	Horses.						*Ponies.*										
	Arab.	Persian.	Northern.	Country-bred.		Total.	Arab.	Persian.		Total.	Total Horses and Ponies.	Italian.	Persian.	Home-bred.		Total.	
Balance on 1st April 1903	2	...	...	...	...	2	2	...	...	2	4	...	1	...	...	1	
Increase ... Purchased in India	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Increase ... By transfer from	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Total ...	2	...	...	...	...	2	2	...	...	2	4	...	1	...	...	1	
Decrease ... Died ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Decrease ... Destroyed ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Decrease ... Sold ...	2	...	...	...	...	2	2	...	...	2	4	...	1	...	...	1	
Total ...	2	...	...	...	...	2	2	...	...	2	4	...	1	...	...	1	
Balance on 31st March 1904 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	

TABLE D.

PROVINCIAL REPORT.

Services and Produce of each class of District Horse and Pony Stallions, during the period between 1st April 1903 to 31st October 1903.

Horse or Pony.	Class.	Stallions on Register.	STALLIONS ACTUALLY EMPLOYED AT STUD.		NUMBER OF MARES COVERED.		AVERAGE OF MARES COVERED PER STALLION EMPLOYED AT STUD.		RESULT OF PREVIOUS YEAR'S COVERINGS.			AVERAGE RESULT OF PREVIOUS YEAR'S COVERINGS PER STALLION EMPLOYED AT STUD.			REMARKS.
			Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	Number of produce.	Number not held.	Number not known.	Average of produce.	Average of not held.	Average of not known.	
HORSE.	Arab	2	2	2	27	42	13·50	21·	9	8*	25	4·50	4·	12·50	* Includes 1 miscarriage and 1 died while pregnant.
	Persian	...	...	...	...	...	...	...	...	...	...	...	...	...	
	Northern	...	...	...	...	...	...	...	...	...	...	...	...	...	
	Total	2	2	2	27	42	13·50	21·	9	8*	25	4·50	4·	12·50	
PONY.	Arab	2	2	2	38	50	19·	25·	10	20†	20	5·	10·	10·	† Includes 1 miscarriage.
	Persian	...	...	...	...	...	...	...	...	...	...	...	...	...	
	Total	2	2	2	38	50	19·	25·	10	20†	20	5·	10·	10·	
	GRAND TOTAL	4	4	4	65	92	16·25	23·	19	28†	45	4·75	7·	11·25	

TABLE E.

PROVINCIAL REPORT.

Cost of feed, keep, attendants, etc., of District Horse and Pony Stallions, during the period between 1st April 1903 to 31st October 1903.

Province.	District.	Number of Stallions.		Total annual cost.		Average cost per Stallion.		Remarks.
		Horse.	Pony.	Horse.	Pony.	Horse.	Pony.	
				Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
Central Provinces.	Saugor ...	1	1	199 12 6	194 12 9	199 12 6	194 12 9	
	Damoh ...	1	...	126 0 7	...	126 0 7	...	
	Narsinghpur ...	...	1	...	183 4 4	...	183 4 4	
	Total ...	2	2	325 13 1	378 1 1	162 14 6	189 0 6	

TABLE G.

PROVINCIAL REPORT.

Casualty Roll of District Donkey Stallions, during 1903-04.

Brand No.	Name.	Class.	Description of casualty.	Nature of casualty.	Remarks.
		Nil.			

TABLE H.

PROVINCIAL REPORT.

(Horse, Pony and Donkey.)

District Stallions sold during 1903-04.

Brand No.	Name.	Class.	Name of Purchaser.	Amount sold for	Remarks showing cause of rejection.
				Rs.	
Nil ...	Yakub Khan ...	Arab ...	Sadhoo, on behalf of Raja Seth Gokul Dass.	211	
,, ...	Sultan ...	,, ...	Daulat Ram, on behalf of Raja Seth Gokul Dass.	171	
,, ...	Shamsher ...	,, ...	Do. do. ...	224	
,, ...	Fussy ...	,, ...	Presented to Colonel Gordon, 13th Duke of Connaught's Lancers, Saugor, by Mr. Napier, to whom it belonged, *vide* Settlement Commissioner's endorsement No. 75-119, dated the 8th January 1904.	...	
			Total ...	606	
			DONKEY STALLION.		
,, ...	Burj ...	Persian.	Officer Commanding, 13th Duke of Connaught's Lancers, Saugor.	50	
			Total ...	50	
			GRAND TOTAL ...	656	

Abandonment of the Horse and Mule-breeding Operations in Central Provinces as per orders contained in Government of India's letter No. 1517-82-2, dated the 25th August 1903.

TABLE J.

PROVINCIAL REPORT.

Services and produce of each class of District Donkey Stallion, during the period between 1st April 1903 to 31st October 1903.

Class of Donkey Stallion.	Stallions on Register.	DONKEY STALLIONS ACTUALLY EMPLOYED AT STUD.				NUMBER OF MARES COVERED,				AVERAGE OF MARES COVERED PER STALLION EMPLOYED AT STUD.				RESULT OF PREVIOUS YEAR'S COVERINGS.						AVERAGE RESULT OF PREVIOUS YEAR'S COVERINGS PER STALLION EMPLOYED AT STUD.					
		For mule-breeding		For donkey-breeding.		Pony mares.		Donkey mares.		Pony mares.		Donkey mares.		Pony mares.			Donkey mares.			Pony mares.			Donkey mares.		
		Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	Number of male produce	Number not held.	Number not known.	Number of donkey produce	Number not held.	Number not known.	Average of male produce.	Average of not held.	Average of not known.	Average of donkey produce	Average of not held	Average of not known.
Italian	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Persian	1	1	1	...	...	24	19	...	...	24	16	...	...	1	8*	10	...	...	...	1'	3'	10'	...	...	...
Etc., etc.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	1	1	1	...	...	24	19	...	...	24	19	...	...	1	8*	10	...	...	...	1'	8'	10'	...	...	...

* Includes 2 miscarriages.

TABLE K.

PROVINCIAL REPORT.

Cost of feed, keep, attendants, etc., of District Donkey Stallions, during the period between 1st April 1903 to 31st October 1903.

Province.	District.	Number of Donkey Stallions.	Total annual cost.	Average per Donkey Stallion.	Remarks.
			Rs. a. p.	Rs. a. p.	
Central Provinces ...	Saugor ...	1	154 13 6	154 13 6	
	Total ...	1	154 13 6	154 13 6	

TABLE L.

PROVINCIAL REPORT.

Breeders and other colts castrated by Veterinary Assistants and Salutries paid from Local Funds in 1903-04.

Province.	District.	Number of colts castrated.			Number of deaths resulting from effects of castration.	Remarks.
		Horse stock.	Mule stock.	Total.		
Central Provinces ...	Nagpur	12	...	12	...	
	Wardha	2	...	2	...	
	Balaghat	...	...	...	...	
	Jubbulpore	...	...	...	...	
	Saugor	...	...	...	...	
	Damoh	1	...	1	...	
	Seoni	...	...	...	...	
	Mandla	...	...	...	...	
	Raipur	6	...	6	...	
	Bilaspur	...	...	...	...	
	Hoshangabad ...	7	...	7	...	
	Total ...	28	...	28	...	

TABLE L (*a*).

PROVINCIAL REPORT.

Statement showing number of animals treated by Veterinary Assistants at Dispensaries, during the year 1903-04.

District or Tahsil.	In-patients.								Out-patients.								Total of in and out-patients remaining on 31st March 1904.	Remarks.
	Remaining on 1st April 1903.	Admitted during the year.	Total.	Number cured.	Number relieved.	Number died.	Result not known.	Remaining on 31st March 1904.	Remaining on 1st April 1903.	Admitted during the year.	Total.	Number cured.	Number relieved.	Number died.	Result not known.	Remaining on 31st March 1904.		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Nagpur	2	63	65	41	9	4	7	4	15	1,572	1,587	1,392	15	21	143	16	20	
Wardha	...	...	...	...	...	...	...	...	6	493	499	431	...	14	48	6	6	
Balaghat	...	...	...	...	...	...	...	...	...	12	12	10	...	1	1	...	...	
Jubbulpore	...	...	...	...	...	...	...	...	5	1,520	1,525	1,274	109	14	121	7	7	
Saugor	...	25	25	22	...	1	2	...	10	1,363	1,373	1,187	...	32	150	4	4	
Damoh	...	...	...	...	...	...	...	...	...	756	756	704	...	3	34	15	15	
Seoni	...	1	1	...	...	...	1	...	13	908	921	657	53	9	202	..	...	
Mandla	...	...	...	...	...	...	...	...	5	575	580	433	8	7	129	3	3	
Raipur	...	8	8	7	...	...	...	1	11	1,198	1,209	1,070	110	11	...	18	19	
Bilaspur	...	...	...	...	...	...	...	...	...	1,931	1,931	914	3	4	955	55	55	
Hoshangabad	...	...	...	...	...	...	...	...	...	1,006	1,006	846	67	3	78	12	12	
Arvi (Wardha)	...	...	...	...	...	...	...	...	...	282	282	216	8	13	36	9	9	
Total ...	2	97	99	70	9	5	10	5	65	11,616	11,681	9,134	373	132	1,897	145	150	

TABLE

Statement showing number of animals treated by the Veterinary Assistants in

Dispensaries.	Number of Veterinary Dispensaries.	Number of Veterinary Assistants employed at the Dispensaries.	IN-PATIENTS.															OUT-PATIENTS.					
			Remaining on 1st April 1903.			Admitted during the year.			Total.			Discharged during the year.			Balance on 31st March 1904.			No. of cases treated during the year.			Average daily attendance.		
			Horses and Ponies.	Cattle.	Other animals.	Horses and Ponies.	Cattle.	Other animals.	Horses and Ponies.	Cattle.	Other animals.	Horses and Ponies.	Cattle.	Other animals.	Horses and Ponies.	Cattle.	Other animals.	Horses and Ponies.	Cattle.	Other animals.	Horses and Ponies.	Cattle.	Other animals.
Nagpur ...	1	2	2	...	...	47	9	7	49	9	7	45	9	7	4	...	...	401	429	757	1·09	1·17	2·07
Wardha ...	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	127	497	157	·34	1·36	·43
Balaghat ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	8	2	·00	·02	·00
Jabbulpore ..	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	526	692	307	1·44	1·89	·84
Saugor ...	1	2	...	...	...	10	15	...	10	15	...	10	15	...	...	...	...	509	813	51	1·39	2·22	·13
Damoh ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	260	385	111	·71	1·05	·30
Seoni ..	1	1	...	...	...	1	...	...	1	...	...	1	...	...	...	...	...	262	472	187	·71	1·29	·51
Mandla ...	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	70	492	18	·19	1·34	·04
Raipur ...	1	2	...	...	...	8	...	...	8	...	...	7	...	...	1	...	...	366	535	308	1·00	1·46	·84
Bilaspur ...	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	400	1,285	246	1·09	3·52	·67
Hoshangabad ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	193	610	203	·52	1·67	·55
Total ...	11	18	2	...	...	66	24	7	68	24	7	63	24	7	5	...	...	3,116	6,218	2,347	8·53	17·03	6.43

L (*b*).

the Head-quarter Dispensary, during the year 1903-04.

RECEIPTS.			EXPENDITURE.			REMARKS.
Fees.	Other heads.	Total.	Salaries.	Other heads.	Total.	
Rs. a. p.	Rs. a p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
576 14 10	2,655 0 0	3,231 14 10	2,177 2 2	848 3 5	3,025 5 7	
...	1,745 0 0	1,745 0 0	1,000 10 11	565 11 2	1,566 6 1	
...	1,130 0 0	1,130 0 0	55 15 4	220 4 3	276 3 7	
135 4 9	2,190 0 0	2,325 4 9	1,033 7 9	629 6 5	1,662 14 2	
29 4 0	1 1 6	30 5 6	871 9 10	672 1 0	1,543 10 10	
...	...	--	495 4 4	427 14 0	923 2 4	
...	1,010 0 0	1,010 0 0	591 4 5	453 14 3	1,045 2 8	
27 2 6	1,445 0 0	1,472 2 6	973 15 11	671 14 10	1,645 14 9	
206 15 1	150 0 0	356 15 1	1,728 10 2	906 0 8	2,634 10 10	
...	1,400 0 0	1,400 0 0	812 8 4	476 4 3	1,288 12 7	
1 3 0	818 13 0	820 0 0	642 9 8	467 0 0	1,109 9 8	
976 12 2	12,544 14 6	13,521 10 8	10,383 2 10	6,338 10 3	16,721 13 1	

TABLE M.

PROVINCIAL REPORT.

Showing districts where outbreaks of cattle disease occurred during 1903-04.

Province.	District.	RINDERPEST.			ANTHRAX.			FOOT AND MOUTH DISEASE.			PLEURO-PNEUMONIA.			CHARBON SYMPTOMATIQUE.			OTHER DISEASES.			TOTAL.		
		Number attacked.	Number died.	Percentage of deaths.	Number attacked.	Number died.	Percentage of deaths.	Number attacked.	Number died.	Percentage of deaths.	Number attacked.	Number died.	Percentage of deaths.	Number attacked.	Number died.	Percentage of deaths.	Number attacked.	Number died.	Percentage of deaths.	Number attacked.	Number died.	Percentage of deaths.
Central Provinces.	Nagpur	272	115	42	30	26	86	65	...	...	8	4	50	...	...	...	...	...	...	375	145	38
	Wardha	160	64	40	105	96	91	394	13	3	...	...	...	...	...	...	9	7	77	668	180	26
	Chanda	...	99	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	99	...
	Bhandra	26	2	7	59	41	69	27	...	...	...	...	..	...	...	...	...	...	...	112	43	38
	Balaghat	...	...	...	...	...	...	679	3	...	...	...	...	...	...	...	...	...	...	679	3	...
	Jubbulpore	...	...	...	447	221	49	143	5	3	...	...	...	...	...	...	33	26	78	623	252	40
	Saugor	...	...	...	748	664	89	71	...	...	...	...	...	...	...	...	...	...	...	819	664	81
	Damoh	...	...	...	553	244	44	11	...	...	...	5	...	...	...	...	...	...	...	564	249	44
	Seoni	...	...	...	530	477	90	2,631	9	...	...	...	...	...	...	...	...	...	...	3,161	486	15
	Mandla	...	...	...	8	8	100	...	...	...	...	...	...	...	...	...	2	1	50	10	9	90
	Raipur	433	241	55	195	172	88	191	...	...	...	...	...	...	...	..	11	2	18	830	415	50
	Bilaspur	267	44	16	6	4	66	...	...	...	...	...	...	...	...	...	...	...	...	273	48	17
	Sambalpur	157	104	66	52	40	77	95	3	3	...	...	...	...	...	...	...	...	...	304	147	48
	Hoshangabad	...	..	...	404	131	32	3,533	6	...	...	...	...	...	...	...	11	10	91	3,948	147	3
	Nimar	...	...	...	4	2	50	191	...	...	...	...	...	...	...	...	...	...	...	195	2	1
	Narsingpur	...	...	...	775	686	88	913	1	...	...	...	...	...	...	...	...	...	...	1,688	687	41
	Betul	...	...	...	649	622	95	99	1	1	...	...	...	...	...	...	5	5	100	753	628	83
	Chhindwara	...	...	...	...	...	...	60	...	...	...	...	...	...	...	...	...	...	...	60	...	...
	Total ...	1,315	669	50	4,565	3,434	75	9,103	41	...	8	9	112				71	51	71	15,062	4,204	27

TABLE M (*a*).

PROVINCIAL REPORT.

Abstract of particulars regarding inoculation with Serum alone method against Rinderpest for the year 1903-04.

Province.	Name of District.	No. of villages.	No. of cattle inoculated.	After inoculaion.		Remarks.
				No. of cattle attacked.	No. of cattle died.	
Central Provinces ...	Wardha ...	7	342	1	1	
	Raipur ...	1	518	15	3	
	Bilaspur ...	4	273	...	...	
	Sambalpur ...	1	2	...	...	
	Nagpur ...	3	138	...	...	
	Bhandara ...	1	82	4	...	
	Total ...	27	1,355	20	4	

TABLE N.

PROVINCIAL REPORT.

Statement showing number of animals treated by Veterinary Assistants, during the year 1903-04.

District,	Tahsil,	RINDERPEST.				ANTHRAX.				FOOT AND MOUTH DISEASE.				PLEURO-PNEUMONIA.				CHARBON SYMPTOMATIQUE.				OTHER DISEASES.				TOTAL TREATED.				Number of villages visited.	Number of Veterinary Assistants employed.
		Died.	Relieved.	Cured.	Total.	Died.	Relieved.	Cured.	Total.	Died.	Relieved.	Cured.	Total.	Died.	Relieved.	Cured.	Total.	Died.	Relieved.	Cured.	Total.	Died.	Relieved.	Cured.	Total.	Died.	Relieved.	Cured.	Total.		
Nagpur ...	...	...	...	...	...	...	...	...	...	...	5	210	215	...	...	...	...	...	...	...	...	2	62	121	185	2	67	331	400	209	2
Wardha ...	...	109	8	65	182	...	...	...	...	...	...	155	155	...	...	...	...	14	1	...	15	1	1	4	6	124	10	224	358	84	1
Balaghat ...	...	...	...	...	...	...	...	...	...	29	...	4,490	4,519	...	...	...	...	...	...	...	...	...	...	...	...	29	...	4,490	4,519	51	1
Jubbulpore ...	...	...	...	...	...	15	...	...	15	6	3	69	78	...	...	...	...	...	...	...	...	9	103	570	682	30	106	639	775	130	2
Saugor ...	...	...	...	...	...	...	...	...	...	...	...	912	912	...	...	...	...	17	...	23	40	28	...	808	836	45	...	1,743	1,788	152	2
Damoh ...	...	...	...	...	...	2	1	27	30	...	...	50	50	...	...	...	...	...	...	...	...	...	5	96	101	2	6	173	181	48	1
Seoni ...	...	...	...	...	...	41	13	...	54	...	65	...	65	...	...	...	...	...	...	2	2	1	59	4	64	42	137	6	185	87	1
Mandla ...	...	...	...	...	...	3	...	2	5	...	280	878	1,158	...	...	...	...	...	...	...	...	...	90	53	143	3	370	933	1,306	530	2
Raipur ...	...	51	44	9	104	41	...	...	41	...	...	384	384	...	...	...	...	8	34	4	46	10	31	387	428	110	109	784	1,003	117	2
Bilaspur ...	...	...	16	3	19	...	...	...	...	...	12	92	104	...	2	...	2	...	...	...	...	...	17	31	48	...	47	126	173	83	2
Hoshangabad ...	...	...	...	...	...	52	8	11	71	...	...	...	...	...	...	...	...	...	...	...	...	...	96	15	111	52	104	26	182	67	1
Wardha ...	Arvi ...	...	...	...	...	...	...	...	...	...	...	20	20	...	...	...	...	6	...	...	6	...	...	16	16	6	...	36	42	60	1
	Total. ...	160	68	77	305	154	22	40	216	35	365	7,260	7,660	...	2	...	2	45	35	29	109	51	464	2,105	2,620	445	956	9,511	10,912	1,618	18

TABLE O.

PROVINCIAL REPORT.

Statement showing Receipts and Expenditure of Veterinary Dispensaries, during 1903-04.

Dispensaries.	RECEIPTS.						EXPENDITURE.							BALANCE.
	Last year's balance.	By Local Fund grant.	By Government grant.	By Municipal contribution.	By other sources.	Total.	Pay.	Travelling allowance.	Medicines, Instruments, etc., etc.	Furniture, land, etc., etc.	Contingencies, stabling, house-rent, etc.	Transferred to Indian Veterinary Dispensary Fund.	Total.	
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Nagpur ...	...	24,75 0 0	...	180 0 0	576 14 10	3,231 14 10	2,177 2 2	346 12 4	209 12 6	...	291 10 7	...	3,025 5 7	206 9 3
Wardha ...	...	1,095 0 0	...	650 0 0	...	1,745 0 0	1,000 10 11	262 1 0	158 0 6	...	145 9 8	...	1,566 6 1	178 9 11
Balaghat ...	...	1,130 0 0	...	...	...	1,130 0 0	55 15 4	0 12 0	138 13 0	73 0 0	7 11 3	...	276 3 7	853 12 5
Jubbulpore ...	...	1,890 0 0	...	300 0 0	135 4 9	2,325 4 9	1,033 7 9	215 2 0	340 7 0	...	73 13 5	...	1,662 14 2	662 6 7
Saugor ...	...	...	...	...	30 5 6	30 5 6	871 9 10	320 1 6	219 15 0	...	132 0 6	...	1,543 10 10	...
Damoh ...	...	...	...	...	...	...	495 4 4	103 0 0	185 13 6	65 0 9	73 15 9	...	923 2 4	...
Seoni ...	...	1,010 0 0	...	...	...	1,010 0 0	591 4 5	119 4 6	173 14 0	22 8 0	138 3 9	...	1,045 2 8	...
Mandla ...	...	1,445 0 0	...	...	27 2 6	1,472 2 6	973 15 11	370 7 6	46 6 0	...	255 1 4	...	1,645 14 9	...
Raipur ...	...	...	...	150 0 0	206 15 1	356 15 1	1,728 10 2	164 13 2	252 8 9	...	488 10 9	...	2,634 10 10	...
Bilaspur ...	...	1,400 0 0	...	...	...	1,400 0 0	812 8 4	166 10 3	141 15 9	...	167 10 3	...	1,288 12 7	111 3 5
Hoshangabad ...	...	758 13 0	...	60 0 0	1 3 0	820 0 0	642 9 8	193 2 6	208 2 0	22 13 0	42 14 6	...	1,109 9 8	...
Total ...	...	11,203 13 0	...	1,340 0 0	977 13 8	13.521 10 8	10,383 2 10	2,262 2 9	2,075 12 0	183 5 9	1,817 5 9	...	16,721 13 1	2,012 9 7

TABLE P.

PROVINCIAL REPORT.

Statement showing Tours of Superintendent, Civil Veterinary Department, during 1903-04.

Rank, name and designation of Officer.	Districts visited.	Fairs and shows attended.	NUMBER OF MILES TRAVELLED.				REMARKS.
			By road.	By rail.	By boat or steamer.	Total.	
Jethiji, Shri Sursinghji Jadeja, Member of the Royal College of Veterinary Surgeons, Superintendent, Civil Veterinary Department, *Central Provinces.*	Nagpur ... ... Wardha ... ... Narsinghpur ... ... Chhindwara ... ... Raipur ... ... Bilaspur ... ... Nimar ... ... Hoshangabad ... ... Jubbulpore ... ... Damoh ... .. Saugor ... ... Bhandara ... ... Balaghat ... ... Mandla ... ... Seoni	Singhaji in Nimar and Chappara in Seoni.	1,201	3,407	*Nil.*	4,608	

TABLE Q.

PROVINCIAL REPORT.

Statement showing Provincial Cost of the Civil Veterinary Department, during the official year 1903-04.

Major Heads.	Superintendent, North-Western Provinces and Oudh.	Superintendent, North Punjab.	Superintendent, South Punjab.	Superintendent, Derajat and Beluchistan.	Superintendent, Bengal.	Superintendent, Madras.	Principal, Ajmer Veterinary School.	Superintendent, Central Provinces and Berar.		Superintendent, Bombay.		Superintendent, Burma.	
								Central Provinces.	Berar.	Local Fund charges.	Provincial charges.	Local District Cess Fund.	Provincial charges.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
								Rs. a. p.	Rs. a. p.				
I.—Prizes at Horse Fairs and Shows.	...	...	...	...	...	...	...	...	...	...	...	...	...
II.—Establishment—Officers,	...	...	...	...	...	...	...	6,480 0 0	...	...	...	...	...
Do. Subordinates,	...	...	...	...	...	...	...	2,081 3 3	2,851 3 2	...	...	...	...
III.—Travelling allowance—Officers,	...	...	...	...	...	...	...	1,828 7 0	...	...	...	...	...
Do. Subordinates...	...	...	...	...	...	...	...	585 9 0	531 13 6	...	...	...	...
IV.—Contingencies ...	...	...	...	...	...	...	...	1,659 5 6	140 5 9	...	...	...	...
V.—Purchase of Stallions...	...	...	...	...	...	...	...	...	...	...	...	...	...
VI.—Stable, feed and keep...	...	...	...	...	...	...	...	267 13 0	...	...	...	...	...
VII.—Road expenses ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	...	...	...	...	...	...	12,902 5 9	3,523 6 5	...	...	...	...

TABLE R.

PROVINCIAL REPORT.

Showing total strength of Subordinate Veterinary Staff employed, during 1903-04.

Province.	PROVINCIAL FUND.		LOCAL FUND.		EMPLOYED IN WORK CONNECTED WITH CATTLE DISEASE, *i.e.*, ON PERIPATETIC DUTY.		EMPLOYED IN DESPENSARIES.		Total.	Remarks.
	Veterinary Inspectors.	Veterinary Assistants.	Veterinary Inspectors.	Veterinary Assistants.	Veterinary Inspectors.	Veterinary Assistants.	Veterinary Inspectors	Veterinary Assistants		
1	2	3	4	5	6	7	8	9	10	11
Central Provinces	...	1	2	16	...	7	2	9	19	

BERAR DIVISION.

TABLE L.

PROVINCIAL REPORT.

Breeders and other colts castrated by Veterinary Assistants and Salutries paid from Local Funds in 1903-04.

Province.	District.	NUMBER OF COLTS CASTRATED.			Number of deaths resulting from effects of castration.	Remarks.
		Horse stock.	Mule stock.	Total.		
1	2	3	4	5	6	7
Central Provinces (Berar Division).	Basim	1	...	1	...	
	Buldana	2	...	2	...	
	Ellichpur	1	...	1	...	
	Wun	1	...	1	...	
	Total ...	5	...	5	...	

BERAR DIVISION.

TABLE L (*a*).

PROVINCIAL REPORT.

Statement showing number of animals treated by Veterinary Assistants at Dispensaries, during the year 1903-04.

Dispensaries.	IN-PATIENTS.								OUT-PATIENTS.								Total of in and out-patients remaining on 31st March 1904.
	Remaining on 1st April 1903.	Admitted during the year.	Total.	Number cured.	Number relieved.	Number died.	Result not known.	Remaining on 31st March 1904.	Remaining on 1st April 1903.	Admitted during the year.	Total.	Number cured.	Number relieved.	Number died.	Result not known.	Remaining on 31st March 1904.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Akola ...	...	...	...	...	...	...	...	...	2	1,090	1,092	973	45	24	45	5	5
Khamgaon ...	...	...	...	...	...	...	...	...	...	1,223	1,223	1,127	9	37	40	10	10
Jalgaon ...	...	...	...	...	...	...	...	...	1	481	482	304	18	11	142	7	7
Basim ...	...	...	...	...	...	...	...	...	...	545	545	485	14	20	22	4	4
Pusad ...	...	...	...	...	...	...	...	...	...	1,405	1,405	1,356	7	40	...	2	2
Mangrulpir ...	...	9	9	9	...	...	...	...	...	380	380	297	...	23	31	29	29
Malkapur ...	...	...	...	...	...	...	...	...	...	1,035	1,035	1,004	19	12	...	...	...
Chikhli ...	...	...	...	...	...	...	...	...	...	991	991	823	50	61	53	4	4
Mehkar ...	...	...	...	...	...	...	...	...	7	820	827	750	5	18	40	14	14
Amraoti ...	...	...	...	...	...	...	...	...	...	1,126	1,126	914	31	11	162	8	8
Morsi ...	...	...	...	...	...	...	...	...	5	741	746	582	79	21	58	6	6
Murtizapur ...	...	...	...	...	...	...	...	...	...	758	758	665	33	31	24	5	5
Ellichpur ...	...	...	...	...	...	...	...	...	3	1,213	1,216	1,163	14	12	16	11	11
Daryapur ...	...	19	19	12	3	1	...	3	2	673	675	627	10	7	25	6	9
Yeotmal ...	...	23	23	20	...	...	1	2	4	837	841	680	32	48	70	11	13
Wun ...	...	2	2	2	...	...	...	...	4	442	446	307	2	21	106	10	10
Darwah ...	...	...	...	...	...	...	...	...	...	374	374	284	11	11	63	5	5
Total ...	...	53	53	43	3	1	1	5	28	14,134	14,162	12,341	379	408	897	137	142

BERAR

TABLE

Statement showing number of animals treated by the Veterinary Assistants in

Dispensaries.	Number of Veterinary Dispensaries.	Number of Veterinary Assistants employed at the Dispensaries.	IN-PATIENTS.															OUT-PATIENTS.					
			Remaining on 1st April 1903.			Admitted during the year.			Total.			Discharged during the year.			Balance on 31st March 1904.			Number of cases treated during the year.			Average daily attendance.		
			Horses and Ponies.	Cattle.	Other animals.	Horses and Ponies.	Cattle.	Other animals.	Horses and Ponies.	Cattle.	Other animals.	Horses and Ponies.	Cattle.	Other animals.	Horses and Ponies.	Cattle.	Other animals.	Horses and Ponies.	Cattle.	Other animals.	Horses and Ponies.	Cattle.	Other animals.
Akola ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	271	496	325	·74	1·35	·89
Khamgaon ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	112	944	167	·30	2·58	·45
Jalgaon ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	80	351	51	·21	·96	·13
Basim ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	94	376	75	·25	1·03	·20
Pusad ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	110	1,233	62	·30	3·37	·16
Mangrulpir ...	1	1	...	...	...	...	7	2	...	7	2	...	7	2	...	...	...	115	222	43	·31	·60	·11
Malkapur ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	96	874	65	·26	2·39	·17
Chikhli ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	161	521	309	·44	1·42	·84
Mehkar ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	253	509	65	·69	1·39	·17
Amraoti ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	288	444	394	·78	1·21	1·07
Morsi ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	60	508	178	·16	1·39	·48
Murtizapur ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	95	574	89	·26	1·57	·24
Ellichpur ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	356	650	210	·97	1·78	·57
Daryapur ...	1	1	...	...	...	5	13	1	5	13	1	5	10	1	...	3	...	167	435	73	·45	1·19	·20
Yeotmal ...	1	1	...	...	...	20	3	...	20	3	...	18	3	...	2	...	...	195	498	148	·53	1·36	·40
Wun ...	1	1	...	...	...	...	2	...	...	2	...	...	2	...	...	...	...	130	279	37	·35	·76	·10
Darwah ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	138	184	52	·37	·50	·14
Total ...	17	17	...	...	...	25	25	3	25	25	3	23	22	3	2	3	...	2,721	9,098	2,343	7·45	24·92	6·41

DIVISION.

L (*b*).

the Head-quarter Dispensary, during the year 1903-04.

RECEIPTS.			EXPENDITURE.			Remarks.
Fees.	Other heads.	Total.	Salaries.	Other heads.	Total.	
Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
...	...	—	468 0 0	182 5 6	650 5 6	
—	...	...	434 4 8	191 7 3	625 11 11	
...	...	...	443 8 9	147 0 0	590 8 9	
...	...	...	416 13 1	122 12 8	539 9 9	
...	...	...	444 0 0	171 4 9	615 4 9	
...	—	...	444 0 0	212 0 0	656 0 0	
...	...	...	400 0 0	579 4 2	979 4 2	
...	...	...	474 8 6	181 4 11	655 13 5	
...	...	...	438 2 1	195 1 0	633 3 1	
...	...	...	468 0 0	238 1 0	706 1 0	
...	...	...	444 0 0	283 13 1	727 13 1	
...	...	...	440 8 0	335 1 6	775 9 6	
...	1,583 5 1	1,583 5 1	584 0 0	262 13 0	846 13 0	
...	938 10 0	938 10 0	564 0 0	176 10 6	740 10 6	
...	...	...	468 0 0	207 4 3	675 4 3	
...	...	...	387 10 6	137 5 9	525 0 3	
...	...	...	400 0 0	197 4 3	597 4 3	
...	2,521 15 1	2,521 15 1	7,719 7 7	3,820 13 7	11,540 5 2	

BERAR DIVISION.

TABLE M (*a*).

PROVINCIAL REPORT.

Abstract of particulars regarding inoculation with Serum alone method against Rinderpest for the year 1903-04.

Province.	Name of District.	Number of village.	Number of cattle inoculated.	After inoculation.		Remarks.
				Number of cattle attacked.	Number of cattle died.	
Central Provinces (Berar Division) ...	Basim	1	468	10	5	
	Total ...	1	468	10	5	

BERAR DIVISION.

TABLE N.

PROVINCIAL REPORT.

Statement showing number of animals treated by Veterinary Assistants, during the year 1903-04.

District.	Tahsil.	RINDERPEST.				ANTHRAX.				FOOT AND MOUTH DISEASE.				PLEURO-PNEUMONIA.				CHARBON SYMPTOMATIQUE.				OTHER DISEASES.				TOTAL TREATED.				Number of villages visited.	Number of Veterinary Assistants employed.
		Died.	Relieved.	Cured.	Total.	Died.	Relieved.	Cured.	Total.	Died.	Relieved.	Cured.	Total.	Died.	Relieved.	Cured.	Total.	Died	Relieved.	Cured.	Total.	Died.	Relieved.	Cured.	Total.	Died.	Relieved	Cured.	Total.		
Akola	Akola	4	...	5	9	...	...	...	...	...	...	14	14	...	...	...	...	1	1	1	3	...	...	2	2	5	1	22	28	5	1
	Khamgaon	...	...	...	...	...	...	...	...	6	20	614	640	...	...	...	...	5	...	...	5	...	1	9	10	11	21	623	655	48	1
	Jalgaon	...	...	...	...	...	...	...	...	...	15	40	55	...	...	...	...	2	3	...	5	...	9	20	29	2	27	60	89	13	1
Basim	Basim	...	...	...	...	...	...	...	...	...	...	202	202	...	...	...	...	11	...	1	12	...	...	...	...	11	...	203	214	25	1
	Pusad	...	...	...	...	...	...	...	...	...	...	755	755	...	...	...	...	...	...	...	...	...	...	...	...	...	...	755	755	105	1
	Mangrulpir	...	...	...	...	...	...	...	...	...	...	36	36	2	4	...	6	4	4	18	26	...	2	9	11	6	10	63	79	29	1
Buldana	Malkapur	...	...	...	...	...	...	...	...	...	...	66	66	...	...	...	...	5	...	...	...	...	...	...	...	5	...	66	71	30	1
	Chikhli	...	...	...	...	...	...	...	...	...	...	154	154	...	...	...	...	41	7	...	48	...	...	...	...	41	7	154	202	65	1
	Mehkar	...	...	...	...	...	...	...	...	...	...	192	192	...	...	3	3	11	1	14	26	...	7	34	41	11	8	243	262	103	1
Amraoti	Amraoti	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	1	3	...	...	...	...	2	...	1	3	5	1
	Morsi	...	...	...	...	...	...	...	...	...	...	19	19	...	...	...	...	4	...	...	4	...	...	...	...	4	...	19	23	2	1
	Murtizapur	...	...	...	...	...	...	...	...	...	...	5	5	...	...	...	...	16	...	4	20	...	...	...	...	16	...	9	25	11	1
Ellichpur	Ellichpur	...	...	...	...	...	...	...	...	...	...	14	14	...	...	...	...	...	...	...	...	1	2	14	17	...	2	28	31	3	1
	Daryapur	...	...	...	...	1	...	2	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	2	3	1	1
Wun	Yeotmal	43	...	51	94	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	43	...	51	94	19	1
	Wun	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	23	...	23	...	23	...	23	30	1
	Darwah	15	4	38	57	10	...	...	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	25	4	38	67	18	1
	Total	62	4	94	160	11	...	2	13	6	35	2,111	2,152	2	4	3	9	102	16	39	157	1	44	88	133	184	103	2,337	2,624	512	17

BERAR DIVISION.

TABLE O

PROVINCIAL REPORT.

Statement showing Receipts and Expenditure of Veterinary Dispensaries, during 1903-04.

Dispensaries.	Receipts.						Expenditure.							Balance.
	Last year's balance.	By Local Fund grant.	By Government grant.	By Municipal contribution.	By other sources.	Total.	Pay.	Travelling allowance.	Medicines, Instruments, etc., etc.	Furniture, land, etc., etc.	Contingencies, stabling, house-rent, etc.	Transferred to Indian Veterinary Dispensary Fund.	Total.	
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Akola	...	...	...	...	...	...	468 0 0	120 0 0	50 5 0	11 0 6	1 0 0	...	650 5 6	...
Khamgaon	...	...	...	...	...	...	434 4 8	120 0 0	40 12 0	21 1 0	9 10 3	...	625 11 11	...
Jalgaon	...	...	...	...	...	...	443 8 9	120 0 0	...	...	27 0 0	...	590 8 9	...
Basim	...	...	...	...	...	...	416 13 1	115 0 8	7 12 0	...	...	...	539 9 9	...
Pusad	...	...	...	...	...	...	444 0 0	125 0 0	46 4 9	...	...	...	615 4 9	..
Mangrulpir	...	...	...	...	...	...	444 0 0	120 0 0	...	...	92 0 0	...	656 0 0	...
Malkapur	...	...	...	...	...	...	400 0 0	110 0 0	296 14 3	85 7 0	86 14 11	...	979 4 2	...
Chikhli	...	...	...	...	...	...	474 8 6	133 2 8	4 9 0	19 8 0	24 1 3	...	655 13 5	...
Mehkar	...	...	...	...	...	...	438 2 1	120 0 0	9 1 0	23 0 0	43 0 0	...	633 3 1	...
Amraoti	...	...	...	...	...	...	468 0 0	132 9 0	81 9 6	3 10 6	20 4 0	...	700 1 0	...
Morsi	...	...	...	...	...	...	444 0 0	125 8 0	111 8 1	30 0 0	16 13 0	...	727 13 1	...
Murtizapur	...	...	...	...	...	...	440 8 0	122 10 0	104 10 9	83 2 0	24 10 9	...	775 9 6	...
Ellichpur	...	601 9 0	...	981 12 1	...	1,583 5 1	584 0 0	...	169 3 0	53 12 0	39 14 0	...	846 13 0	...
Daryapur	...	721 10 0	...	217 0 0	...	938 10 0	564 0 0	...	145 6 6	26 4 0	5 0 0	...	740 10 6	...
Yeotmal	...	...	...	...	...	...	468 0 0	120 0 0	...	...	87 4 3	...	675 4 3	...
Wun	...	...	...	...	...	...	387 10 6	107 4 0	...	...	30 1 9	...	525 0 3	...
Darwah	...	...	...	...	...	...	400 0 0	130 12 0	...	...	66 8 3	...	597 4 3	...
Total	...	...	1,323 3 0	...	1,198 12 1	...	2,521 15 1	7,719 7 7	1,821 14 4	1,067 15 10	356 13 0	574 2 5	—	11,540 5 2	...

BERAR DIVISION.

TABLE R.

PROVINCIAL REPORT.

Showing total strength of Subordinate Veterinary Staff employed, during 1903-04.

Province.	PROVINCIAL FUND.		LOCAL FUND.		EMPLOYED ON DISPENSARY AS WELL AS PERIPATETIC DUTIES.		Remarks.
	Veterinary Inspectors.	Veterinary Assistants.	Veterinary Inspectors.	Veterinary Assistants.	Veterinary Inspectors.	Veterinary Assistants.	
1	2	3	4	5	6	7	8
Central Provinces and Berar ...	2	...	...	17	2	17	The Berar Provinces have been divided into two Divisions—East and West, each in charge of an Inspector. The East Division has 9 dispensaries and the West 8, each having one Assistant doing dispensary as well as peripatetic work.

Pioneer Press No. 1711—17-12-04.

REPORT

ON THE WORKING OF THE

DEPARTMENT OF AGRICULTURE

CENTRAL PROVINCES

FOR THE YEAR ENDING

31ST MARCH 1905.

Agents for the sale of Books published by the Central Provinces Administration.

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CENTRAL PROVINCES ADMINISTRATION.

Revenue Department.

No. 6880.

Nagpur, the 25th October 1905.

READ—

Report on the Department of Agriculture, Central Provinces, for the year ending the 31st March 1905.

READ ALSO—

Report on the working of the three Experimental Farms for the same year, and letter No. 220, dated the $\frac{\text{29th August 1905}}{\text{13th September 1905}}$, from the Director of Agriculture, Central Provinces, forwarding the same.

Report on the working of the Provincial, District and Court of Wards Gardens for the same year, and letter No. $\frac{4218}{111}$, dated the $\frac{\text{31st July 1905}}{\text{9th August 1905}}$, from the Commissioner of Settlements and Agriculture, Central Provinces, forwarding the same.

Report on the working of the Civil Veterinary Department for the same year, and letter No. 170, dated the 21st August 1905, from the Director of Agriculture, Central Provinces, forwarding the same.

RESOLUTION.

The Department of Agriculture was administered during the year by the officer who also held the posts of Commissioner of Settlements and Director of Land Records, but since the close of the period to which the report relates a much-needed reform has been carried out and a separate Director of Agriculture has been appointed Now that the excessive pressure of work has been relieved by the creation of a new appointment, the Chief Commissioner hopes that the agricultural reports will be more punctually submitted in future. The report on the management of Provincial and District Gardens was due on the 1st July, but was not received until the 10th August. The delay is ascribed to the late receipt of statements from the Chhindwara District, but the Director should see that similar delay is not allowed to occur in future. It greatly detracts from the interest and value of the reports themselves if they are not issued till long after the close of the period to which they refer.

2. The fact that agricultural education in its higher branches is at present in a stage of transition probably explains the somewhat inconclusive remarks made by the Director on the subject. Various objections to existing arrangements are made, and these must be left for consideration in connection with the reforms which the liberal provision made by the Government of India for agricultural work has enabled the Administration to undertake. The Nagpur School even with its present equipment does useful and valuable work; and the Chief Commissioner anticipates great benefits to the Province from the arrangements that are now being carried out. The School will eventually become a College teaching up to the Pusa standard and furnishing a supply of men with both scientific and practical knowledge, whose influence on the future progress of agriculture and of the agricultural classes in these Provinces will be very marked. The Chief Commissioner fully realizes the limitations of such an agricultural education as it is proposed to give. A few years at school or college cannot produce trained agriculturists; but what is expected of the institution is that it shall turn out men who are alive to the great possibilities of agricultural improvement, who are genuinely interested in promoting the welfare of the rural population and who have been imbued with the spirit of accurate and scientific enquiry and with the faculty of observation,

and have acquired a good preliminary technical and scientific training. The pupils of the institution should be, by the direction given to their studies, well fitted to enter on practical life, and the best of them will, it is hoped, be prepared to continue their training at Pusa and qualify themselves as experts in one or other of the sciences taught there. The demand for such experts cannot be met in this country now, and is likely to become much more pressing in the future.

3. The normal classes are a valuable adjunct to the Agricultural School, and the Chief Commissioner agrees with the views held by the Inspector-General of Agriculture as to the direction to be given to the training there. The amount of technical knowledge imparted cannot be great, and much of the detail that is learned will doubtless be forgotten. The object of the normal class should be to train the teachers to interest their pupils in agriculture and in the natural objects around them and make them realize that their education in school is closely connected with their future avocation. The Chief Commissioner has not seen any of the demonstration plots attached to schools to which the Officiating Director refers, but it is possible that the system may have been carried too far, and care must be taken that in no case is the schoolmaster allowed to utilise such plots for his own private benefit as a cultivator. The evidence given in paragraph 8 of the practical usefulness of the class for members of the land-owning classes is gratifying.

4. Steps are being taken to publish an English edition of the "Agricultural Gazette" which will probably be useful, and the Chief Commissioner entirely approves of the proposals to prepare a booklet for visitors to the Nagpur Farm, giving a brief description of the experimental series in progress, which will enable visitors to take a more intelligent interest in the operations.

5. The experiments at the three farms at Powarkhera, Labandih and Nagpur appear to have been conducted on practical lines. At Powarkhera, where the farm is not in full working order, experiments were made as to the value of embanking fields and the methods of eradicating *kans*, both important matters in this tract of country. The Labandih Farm at Raipur is devoted chiefly to rice cultivation, and appeared to the Chief Commissioner, who visited it, to be conducted intelligently and well. The Nagpur Experimental Farm continues to do useful work, particularly in the distribution of good seed, which Mr. Miller believes to be one of the most useful measures that it is possible for a Government Department to undertake for the improvement of agriculture. No very definite success has so far attended the efforts to produce a rust-resisting wheat, but the experiments in improving the staple of indigenous varieties of cotton by hybridization are very interesting and promise to be more successful than the introduction of exotic varieties. Samples of tree cotton have also been collected with a view to growing the better varieties on the farm, and, if possible, improving them. The method of pickling *juar* seed with sulphate of copper is reported to have been keenly taken up by the cultivators of several districts. The report of the Nagpur Farm contains an interesting account of a form of pit silo, the simplicity of which seems to promise hopes of its adoption by villagers for fodder purposes. The three cattle-breeding farms are gradually increasing their stocks, which have been carefully weeded of bad specimens. The results at the farm near Nagpur promise to be very satisfactory, and the existence of a pure-bred herd there of a well-known local breed should have a most beneficial effect in improving the cattle of the southern districts, and in stimulating the interest which the people already feel in this subject. These experiments proceed entirely in the right direction—the endeavour to improve the indigenous article.

6. Mr. Low suggests that Co-operative Credit Societies may be induced to purchase improved agricultural machinery for the use of their members. This is a development which the Chief Commissioner requests the Director to postpone indefinitely. The most well-meaning advice in such matters is apt to be misconstrued into an order, and the purchase of an implement, the action of which is but imperfectly understood by those who have to work it, not infrequently results in failure. When the societies have advanced to the stage of conducting their petty loan transactions successfully, the next step is to endeavour

by co-operation to obtain for the agriculturist a better price for his produce, and to supply him with good seed. For the present it must be distinctly understood that no official endeavours of any description are to be made to induce Co-operative Societies to deal in the sale of improved machinery.

7. Much progress has been made in the embanking of fields in the northern districts of Saugor and Damoh, though the results were considerably marred by the excessive frost of the season, which is particularly liable to damage embanked land. A campaign was organized with considerable success against locusts, which made their appearance in Berar and the western districts of the Central Provinces.

8. During the year under report the system of crop-cutting experiments was extended throughout all the six districts of Berar, but the results have lost a great deal of interest owing to the inexact record of soils on which the crops cut were grown. It is needless to point out that this entirely vitiates the value of the experiment and that the utmost care should, in future, be taken carefully to observe and record the soil and other characteristics of the field in which each experiment is conducted.

9. The services of a trained gardener have been obtained for the post of Superintendent of the Maharaj Bagh Garden, and it is hoped that this official will, besides his proper duties, be able to visit and give much valuable advice to the Superintendents of District and Jail Gardens in other parts of the Province. The management of gardens does not seem to the Chief Commissioner to be on a satisfactory footing at present. It is impossible for a Central Department to exercise much control over gardens scattered all over the Province. Its exertions should be directed rather to the training of men for the post of gardener, to the giving of advice, and to the supply of plants and seeds. The gardens themselves should be managed and financed locally. It is observed that not a single garden in these Provinces is self-supporting. At Nagpur the expenditure is Rs. 13,400 and the receipts Rs. 4,800, while district gardens cost provincial revenues Rs. 14,800 and produced receipts of Rs. 6,000. The Chief Commissioner realises that a garden maintained for purposes of research or experiment cannot be expected to pay its way, and that a garden like the Maharaj Bagh may reasonably receive exceptional treatment; but the fact that local gardens generally place a considerable expense on provincial revenues appears to him merely to illustrate the usual effect of a Government subsidy of indefinite amount, and the Director should consider the question of transferring the financial control to local management with a specific grant from Government for a term of years.

10. Two new Veterinary Inspectors were appointed during the year, though they only worked for a small portion of it. Five new dispensaries were opened in the Central Provinces and four in Berar and the grant of Rs. 25,000 sanctioned for the construction of veterinary dispensary buildings was fully worked up to. The Superintendent, Civil Veterinary Department, complains of delay made by Patwaris in reporting cases of the outbreak of cattle-disease, and the attention of District Officers is being directed to this matter If the veterinary officers are to do useful work in the suppression of outbreaks they should get the very earliest possible intimation of them.

11. Rinderpest was responsible for heavy mortality among cattle in the south of the Central Provinces and in Berar, and the Chief Commissioner observes with satisfaction the marked increase in the inoculation work done, and the pains taken by Mr. Jethiji to train Veterinary Assistants personally in the work. His report contains an interesting statement relating to cases of cattle-poisoning which occurred in the Chhindwara district from eating *juari* stalks. In this case the Government Chemical Analyser reported that the plant at a particular stage contained a high percentage of prussic acid, which appears to be the poisonous principle. Considering what a large share *juari* stalks take in the fodder of agricultural bullocks in many parts of the Provinces, this matter seems to require further investigation and to call for the continued attention of the Superintendent.

12. The financial condition of the Veterinary dispensaries also calls for consideration, as it appears that they are in some cases supported by Municipalities and in others by District Councils without much regard to the amount of benefit which the inhabitants of the towns and outlying villages respectively derive from them. The proposals on this subject, which the Director of Agriculture is submitting, will be awaited. The Chief Commissioner agrees with Mr. Jethiji in thinking that it is undesirable at present to charge any fees at veterinary dispensaries, save from well-to-do persons in the form of strictly voluntary subscriptions, as the levy of fees is likely to hinder the popularization of the institutions.

13. Mr. Mukerji's report on the silk cultivation in the Central Provinces and Bengal has been considered by the Director of Agriculture and the Chief Commissioner, and orders have been issued to make enquiries with a view to find areas of malguzari forest suitable for tussar silk moth cultivation, to ascertain what amount of wild jungle cocoons can be obtained through the Departmental agency of the Forest Department and to encourage the planting of trees of the best kinds and in a suitable manner for this industry. The Director has also been asked to submit proposals for the starting of a tussar silk *bari* on the lines suggested by Mr. Mukerji, for the twofold purpose of supplying good seed and of demonstrating the best methods of cultivating the insect and of reeling the silk. Steps have also been taken to introduce to the reelers of the Sambalpur District the improved Japanese methods practised at Bangalore.

14. The small Museum at Raipur is well kept, and the large number of visitors to it shows the interest taken by the local public in such institutions. The Museum at Nagpur, on which at one time or other much attention has been bestowed, is less worthy of its position at the head-quarters of the Province. The economic specimens are now being removed to the Victoria Technical Institute, and the opportunity should be taken to re arrange and extend the remainder of the collections. From what he has seen of Provincial Museums elsewhere the Chief Commissioner has no doubt that Nagpur has already sufficient specimens to form the nucleus of a collection that will do credit to the Province The Director of the Geological Department has kindly undertaken to re-arrange and supplement the valuable collections of geologial exhibits, and the Chief Commissioner trusts that the Director of Agriculture will be able to make equally satisfactory arrangements in other departments. He is prepared to consider the question of more liberal financial assistance, if necessary, and of the appointment of a whole-time Curator.

15. Since the close of the year under report funds have been provided by the Government of India that will allow of a great expansion of the work of the Agricultural Department in the future. Up to the present the control of the department has formed merely one of the duties of an officer who has much other work of the most responsible character to attend to. That so much good work has already been accomplished under conditions so difficult, and so much success attained, is due to the foresight and energy of the officers who have exercised control—more especially in recent years—Messrs. Sly and Standen. The Chief Commissioner is also aware how fully Mr. Joshi has justified his selection as Assistant Director by his administrative ability and his power of initiative.

ORDER—Ordered, that a copy of this Resolution, together with the enclosures, be submitted to the Government of India in the Revenue and Agriculture Department, and that copies be forwarded to the Director of Agriculture, and to all Commissioners and Deputy Commissioners, Central Provinces, for information and guidance, and that it be published in the Supplement to the *Central Provinces Gazette*.

E. H. BLAKESLEY,

Chief Secretary to the Chief Commissioner,

Central Provinces.

Sectt. Press, Nagpur :—No. 1609 R.D.—26-10-05—625.

No. 221.

FROM

C. E. LOW, ESQ., I. C. S.,

DIRECTOR OF AGRICULTURE,

Central Provinces,

TO

THE CHIEF SECRETARY TO THE HON'BLE THE CHIEF COMMISSIONER, CENTRAL PROVINCES,

REVENUE DEPARTMENT.

Nagpur, the 29th August 1905.

SIR,

I have the honour to submit the annual report on the Department of Agriculture for the year ending 31st March 1905. Owing to the separation of the Agricultural and Land Records Department certain subjects dealt with in this report, *viz.*, Experimental crop-cuttings and Meteorology, will, if the proposals submitted are accepted, remain under the Settlement Commissioner. But as orders have not yet been received on these proposals, the paragraphs in question have been written in the Commissioner of Settlements' office this year and included in this report.

I.—PREFATORY.

2. The special establishment was the same as last year, save that two probationary Assistants were employed in addition. The staff at present is only engaged on a temporary basis, but there appear to me strong arguments in favour of making the cadre a permanent one. In the first place, this staff will form part of that the entertainment of which was contemplated in Revenue Secretariat letter No. C-20, dated the 20th May 1905. In the next, the demonstration work on which the present temporary staff are employed suffers at present from lack of continuity. Sufficient experience of local conditions cannot be obtained till the staff has worked for at least four or five years in the same place, and a lack of knowledge of these is often responsible for apparent failures of what are really sound methods. It is necessary to employ the same men for long periods and not to lose their services just as they are gaining experience.

Proposals were submitted after the close of the year for filling up one of the posts of Agricultural Superintendents which is immediately necessary for the supervision of actually existing operations, but the whole question of staff will have to be entirely reconsidered in view of the great increase in establishment contemplated in the Secretariat letter quoted above.

3. The post of Director was held by Mr. Standen, in addition to that of Commissioner of Settlements and Director of Land Records, throughout the year. Since its close, these posts have been separated, and I took over charge of the new post of Director of Agriculture on the 26th July 1905. I am therefore

under the great disadvantage, in writing this report, of having seen nothing of the actual working of the Department during the year. Mr. Joshi held the post of Assistant Director of Agriculture throughout the year. Two of the Agricultural Assistants were reverted to the regular line because it was found that owing to the extension of settlement operations they were likely to lose promotion by remaining. In order to meet the demand for trained Agriculturists for Court of Wards cultivation, two probationary Agricultural Assistants were entertained, and it was found possible to depute a man to hold charge of the home-farm of the Fatehpur Estate under the Hoshangabad Court of Wards.

Touring.

4. During the year Mr. Standen inspected the Raipur and Hoshangabad farms, and the demonstration plots in the Raipur and Bilaspur Districts. Together with Mr. Joshi, he attended meetings of the Agricultural Associations at Wardha, Raipur and Nagpur.

It was not found possible for either the Director of Agriculture or the Assistant Director of Agriculture to be present at the Agricultural Conference at Pusa, but the intimate local knowledge of the Central Provinces possessed by Mr. Sly, the acting Inspector-General of Agriculture, rendered the presence of a Central Provinces representative unnecessary.

Mr. Joshi, the Assistant Director of Agriculture, organised the Central Provinces section of the Bombay Exhibition, and conducted a party of ninety local agriculturists and others to the Exhibition. He was as usual on tour all through the year, and was constantly inspecting the farms and demonstration plots throughout the Province. Having, when Deputy Commissioner of Hoshangabad, personally accompanied Mr. Joshi to some of the less accessible plots during the rains, I can testify to the hard work and exposure which these inspection tours have entailed on him. He also attended the meetings of six different District Agricultural Associations. Besides this, he dealt with numerous references on technical subjects from the office of the Director and was responsible for the immediate control of the farms and of the special establishment. Mr. Standen was of opinion that an Agricultural Superintendent was needed to share the inspection work.

II.—Agricultural Education.

Agricultural School.

5. There was no change in the work or staff of the Agricultural Schoo during the year. Steps are, however, being taken, in pursuance of the policy laid down in letter No. $\frac{11\text{-A}}{81\text{-}1}$, dated the 8th April 1905, of the Government of India, to remodel the entire constitution of the Educational part of the Department's work. This is not the place to enter into any detailed description of the changes contemplated, but I may briefly state that the school is to be turned into a college with Experts in Agriculture and certain special branches of science as lecturers. The necessary class rooms and instructional laboratories will be located in the Victoria Technical Institute, and a range of buildings containing special laboratories for research will be erected.

English Classes.

6. The senior class received 14 students, of whom 11 appeared at the examination and 10 passed; and 11 students entered for the junior class, of whom 8 appeared at the examination and all of them passed.

I am not in a position to criticise the work of the classes for obvious reasons; but with reference to Mr. Standen's remarks in last year's report, I may state that I am considering the advisability of extending the term of the junior class by one month in order to enable late arrivals to make up for lost time. It is necessary to begin work from 1st June, on account of the practical agricultural work of the year starting from then, while the date of the Matriculation examination and consequently the date at which its results are made known cannot be changed to suit the convenience of a few students.

Mr. Standen was, I understand, of opinion that there was a lack of control and of real interest in practical agriculture among the staff. There is the further difficulty that the staff are not on the regular line of the Educational Department and are consequently debarred from that avenue of promotion. The reason stated by the Director of Public Instruction is that their training has been of too technical a character to fit them for employment as Deputy Inspectors. At the same time, there is grave reason to doubt if they will be fit to send to Pusa or elsewhere so as to qualify them for posts as Assistants and Sub-Assistants to the Experts who are to join the Department. Their age alone, which I believe in most cases exceeds thirty years, would seem to unfit them for any further special training. None of them are Bachelors of Science, which is the obligatory qualification for training at Pusa in Agricultural Chemistry.

The expenditure on these classes was Rs. 3,420.

Normal Classes.

7. The number of schoolmasters under instruction in the Normal Classes was 106, of whom 60 were in the Hindi and 46 in the Marathi class: of these 94 passed their examination. This year the Normal school students, who usually join the class in November, did not present themselves for admission until January owing to the session of the Normal Classes ending on 20th December this year instead of on 10th October. The term of the Normal Classes was therefore extended till May, though during the latter two months there is very little practical work that can be shown to them.

It is in contemplation to remodel the constitution of the Normal Classes. I understand the views of the Acting Inspector-General of Agriculture are that the teaching of agricultural subjects to the boys in primary schools has for its main object the widening of the boys' mental outlook by teaching them to connect the ideas which they acquire from their books with the natural objects that they see around them, and he thinks that this object has been somewhat overlooked in the desire to impart technical knowledge. He would therefore like to see the subject of agriculture taught *pari passu* and on the same lines with other subjects, over the whole two years' course instead of in a six months' final course.

For similar reasons I would deprecate the attempts made in some districts to maintain what are virtually small demonstration plots attached to village schools. Good school gardens on not too large a scale are a proved success in many places, and have a valuable educative effect. But I doubt if the cultivation of small fields even on improved methods is really of much good to the boys, while there are certain obvious objections. One is that the conduct of a demonstration farm by a partially trained man often results in failure or the dissemination of bad methods. Another is that these plots are likely to clash with the extended programme of demonstration plots that the Agricultural Department have in view: while there are certain strong reasons for not allowing the schoolmasters to associate themselves too much with agricultural operations and especially to obtain, with whatever object, plots of land from local agriculturists free of rent. I put forward these views with hesitation, and can claim for them no weight beyond what my short experience as a Deputy Commissioner entitles them to. The cost of the Normal Classes was Rs. 2,502.

The Malguzari Class.

8. The number of pupils in the Malguzari Class this year was 20, of whom 15 appeared at the examination and 14 passed. Since the close of the year a young man was sent to the class by Raja Seth Gokuldass, of Jubbulpore, at the Raja's expense, to qualify as a manager of the Raja's home-farm cultivation. He is reported to be an intelligent and practical man. A ward of the Balaghat Court of Wards after passing through the class was considered by the Deputy Commissioner fit to hold charge of his own estate, which contains extensive home-farm cultivation, and proposals have been submitted for making his estate over to him. It will be interesting to see to what use he puts the instruction he has gained. Mr. Standen took the opportunity when on tour of looking up several of the ex-pupils: in two cases the results were distinctly encouraging, as he found the lads practising improved methods of cultivation themselves and inducing their tenants to follow their

example: Three other men with small areas of land, or none at all, were not putting their knowledge to any particular use. The inference is obvious. The cost of the class was Rs. 2,084.

Publication of agricultural information.

9. There is some falling off in subscribers to the *Agricultural Gazette*, the total number having fallen from 1,938 to 1,907. The number of officials and non-officials on the free list are 396 and 236, respectively. It has been suggested to me that the publication of an English edition would lead to more interest being taken in this little journal by District Officers, and perhaps induce them to write a few more articles for it themselves, and I am asking for opinions on the point. An English edition would, moreover, be useful for distribution outside the Provinces. The great want at present is of less lengthy articles, brighter and more interesting in tone. Without going quite to the lengths that some American agricultural journals seem to find it necessary, I think the *Gazette* might be made a little more amusing while losing nothing of its instructive nature. The cost of the publication was about Rs. 145 per mensem, and the probable extra cost of separate English edition would be about Rs. 70 a month.

Other official publications.

10. Besides the regular forecasts and reports, a set of brochures were issued during the year giving the methods of cultivation of the principal seeds distributed through Agricultural Associations. It is proposed to issue a booklet for visitors to the Nagpur Farm, showing in statement form, with a brief description, exactly what is being done in at any rate the more important experimental plot series, with a map referring to the various plots by number. The need for this was recently pointed out to me by a visitor to the farm.

III.—Agricultural Enquiry and Experiment.

A.—Experimental Farms.

11. The season was unfavourable to rice, especially on the Nagpur and Powarkhera Farms; while the delay in completing the new Telinkheri pipe line in the one case and the wells in the other case resulted in the total failure of the rice crop. The year was not a bad one for cotton and juar; rice did better in the Chhattisgarh Farm than might have been expected; while the season was rather too dry for wheat save in embanked fields.

Improvements.—Much remains to be done at Powarkhera in the way of levelling fields and preventing erosion, and until this work is completed uniform results cannot be looked for. The well at Labhandih has also not yet been finished, otherwise the building programme at the two farms has been fairly well worked up to. The new Telinkheri pipe line is not in working order, nor have the two Dutch barns at Nagpur and Telinkheri yet been properly constructed; a good deal has been done incidentally, I am told, to improve the flow in the old pipe line.

The more important results on the Nagpur Farm may be summarised as follows:—

(*a*) *Series of experiments.*—The superiority of saltpetre as a top-dressing in the case of irrigated crops to most other forms of manure was fully established.

(*b*) *Introduction of new varieties.*—The superiority of the awned variety of *bajra* was maintained and an effective demand from cultivators has arisen. A new species of juar for use as fodder has been procured from Poona; it promises well. The large-seeded Bilaspur variety of *tur* is believed to be unsuited for open field cultivation and is likely to do better as a garden crop.

Dharwar tilli was found to deteriorate greatly when sown on the farm and by no means retained the high oil-producing properties that had led us to attempt its introduction here.

(*c*) *Cultivation of varieties for seed distribution.*—The *saoneri* variety of juari was distributed to several districts, where it proved a success.

The Upland Georgian variety of cotton has been acclimatized on the farm during the last 10 years, and it was this year distributed in several districts in the Central Provinces and Berar, where it did fairly on the whole. There has been a considerable demand for the improved variety of ground-nut from several quarters.

(*d*) *Production of new varieties of cotton and wheat by hybridising.*—It is reported from two of the northern districts, though not with the precision that could have been wished, that the cross-bred wheat is not a rust-resistant there ; if this is the case, and if the cross-bred wheat is only rust proof in Nagpur, it will be necessary to evolve a wheat which will withstand rust in the Nerbudda Valley. Experiments in the crossing of cotton still continue.

(*e*) *Investigation of plant diseases.*—Extensive demonstrations were conducted in order to teach the cultivators of Berar and the western districts of the Central Provinces the advantages of the sulphate of copper treatment of juar, and it is believed that it has caught on, especially in Berar. Two other fungicides were tried, but, owing to the absence of smut on the farm, without result.

(*f*) *Trial of implements.*—The Hoshangabad bakhar was tried this year ; it seems to possess certain points of superiority over the local one. The bullock-power cotton gin did well, getting through 500 lbs. kapas a day ; its sale will be pushed by a demonstration party next year. The farm obtained the award of a gold medal for its exhibit of implements at the Bombay Exhibition.

12. The operations of the Telinkheri cattle farm might, I think, be more fittingly described in the Veterinary Report another year. The number of cattle increased from 75 to 108. Colonel Morgan, the Inspector-General of the Civil Veterinary Department, who visited the farm appears to have been favourably impressed with its management. Extensive use was made of ensilage to help the cows through the hot weather. Several animals were cast under Colonel Morgan's orders.

13. The Powarkhera Farm is not so advanced, so far as the actual cultivation goes, as the Labhandih Farm. Much still remains to be done in the way of levelling the fields. The most interesting results were obtained in respect of the embanked fields, where, in this year of light rainfall, the outturn was nearly double that of the unembanked fields. The Batchelor plough for the eradication of kans was experimented with and gave very good results. The number of cattle on the cattle farm increased from 33 to 60.

14. The farm at Labhandih has already reported some most interesting experiments in rice cultivation. As was expected, transplanted rice was proved to do by far the best ; the results of *biasi* came next, next to *biasi* came the *lei* method (sowing by previous germination), and last of all unoperated rice, the yield of which was about half that of *biasi*. This last result corresponds with the popular idea on the subject. I am under the disadvantage of never having seen the farm and so cannot say if the *lei* method has been practised in soil suitable to it. The result of sowing a second crop after rice, with and without ploughing for a second crop, were obscured by the dry year.

B.—Agricultural demonstrations and enquiries:

15. The cultivation of juar and cotton by the Nagpur methods was continued in Chhattisgarh, five plots having been selected in the Janjgir Tahsil of the Bilaspur District, and five near Drug in Raipur. The demonstration was a success in dorsa (brown) and kanhar (black) soil in Janjgir, while it failed in two yellow soil plots, not, it is stated, because of the nature of the soil, but because the fields were too low-lying and retentive of water. In Drug the experiment did very well in three plots on well-drained slopes of brown soil, but failed owing to water-logging in two cases. It is not easy to determine without previous knowledge of local conditions whether a field is sufficiently well drained for juar

cultivation. Similar cultivation at the Labhandih Farm on dorsa soil did well. There is not much to show that the local cultivators are copying our methods—save in a few places in Mungeli, where the original demonstration plots are started. As I was myself responsible for the initiation of this particular kind of cultivation in Chhattisgarh, in the years 1899 and in 1900, on the advice of Mr. R. H. Craddock, C. S. I., then Commissioner of Settlements, I should like to express my own personal opinion that the proper theatre for these experiments is in the west of the Chhattisgarh plains, and especially in the Pandaria Zamindari, the west of the Mungeli Tahsil and in the Kawardha State, where the rainfall is lower than anywhere else in Chhattisgarh, and there are large and often well-drained stretches of black and brown soil. Futhermore, prior to the opening of the rail, these areas grew large quantities of cotton yarn though it was of inferior quality owing to unskilful cultivation. Kawardha was a great weaving centre, and still contains numerous weavers. In 1867, Bilaspur grew as much cotton as Nagpur.

The Chamars round the Labhandih Farm have taken up the cultivation of juari, though only on the broadcast system, and bring a good deal of *karbi* into Raipur for sale. The great obstacle to the sowing of seed in regular lines is that given by Mr. Standen in last year's report, *viz.*, the fact that the Chhattisgarh bullocks have no nose-strings. I consider that the cultivators might get over this difficulty by employing, for the first few years at any rate, a method which I found advantageous, that of sowing by the single-tube sowing plough of the country which is always used for wheat cultivation. I am sure it would be a great mistake to give up the efforts in Mungeli and in the west of the tahsil. I have a strong recollection of the fine crops of juari that were growing there in the early cold weather of 1900; and it was only the heavy rain in the beginning of 1902-03 that spoiled the appearance of the crops at that time. This is emphatically a case where a prolonged experience of local conditions is a necessary preliminary to the successful introduction of a new crop.

I give below the cropping figures in the Raipur and Bilaspur Districts for cotton and juar for the last four years :—

District.	1901-02 area.		1902-03 area.		1903-04 area.		1904-05 area.	
	Cotton.	Juar.	Cotton.	Juar.	Cotton.	Juar.	Cotton.	Juar (including mixture).
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Raipur ...	9,426	1,405	12,981	12,254	18,988	17,028	13,065	1,973
Bilaspur ...	5,721	1,505	5,069	1,054	9,569	1,848	6,572	737

I had no time to ascertain the reason for the large decline in the Raipur figures this year and give them for what they are worth. The cultivators do not do much in the way of storing seed; but they at any rate take the trouble to scare birds off, which I found they would hardly ever do in the series of experiments I conducted. The Dharwar rice field juar did well on the Labhandih Farm and in the Raipur Burha gardens, but it is an inferior kind of juar in itself and the grain is of poor quality.

Hoshangabad, improved kharif.

16. The history of this experiment has been as follows. In the Hoshangabad District, to the east of Seoni town, the kharif cultivation is broadcast, while on the west of that town, though the crops are sown in regular lines, yet sowing is only done with a single-tube drill attached to a bakhar or scarifier by a rope. In 1902 the first attempts were made to improve the kharif cultivation in the Sohagpur and easternmost tahsil of the district. The experiments were completely successful and aroused much local interest at the time. Owing, however, to the better seasons wheat once more recovered its old supremacy and kharif was practically driven out of the field. Thus the continuance of the demonstration plots in the east of the district became unnecessary, and were moved to the west of the district where cotton cultivation is becoming very important. The local cultivators in some cases are following the example set them and one cultivator of a village close to Seoni town has sown a large field on the improved method this year.

17. An ensilage demonstration was conducted last year at Shopur, a village in the Seoni-Malwa Tahsil, owned by an enlightened and wealthy malguzar, who is said to be making ensilage on his own account this year. Another Hoshangabad malguzar of the Sohagpur Tahsil is said to be doing the same, but, generally speaking, the practice does not seem to have caught on with the local cultivators. Continued demonstrations over longer periods in the same areas are undoubtedly required.

Ensilage.

18. The fodder-cutting machine was exhibited in the Nimar, Hoshangabad Saugor, Betul, Chhindwara, Chanda and Wardha Districts, and in every district in Berar. Thus every important juari-growing district in the Province had an opportunity of seeing its working, and the result was a sale of 37 machines. It was found possible to reduce the price of the machines from Rs. 215 to Rs. 150 by an arrangement with the manufacturer and by ordering through a different agent. The winnowers were exhibited in the same District.

Fodder cutters and winnowers.

19. Bullock gear for the machines was also sold to numerous purchasers. It is hoped next year to push the sale of the bullock gear for cotton, and efforts will, it is understood, be made to induce Co-operative Credit Societies to take up the purchase of machinery for the use of their members. A statement showing the sale of the different classes of machines for districts is appended below :—

Statement showing the sale of implements from the Experimental Farm, Nagpur, during the year 1904-05.

No.	Names of districts.	Swedish plough.	Turn Wrist plough.	Horse hoes.	Hand thresher.	Winnower.	Smalley fodder-cutter.	Junior feed-cutter.	Levell cutter.	Bullock gear.	Corn sheller.	Perfection sprayer.	Mathews seed drill.	Tatoo marker.	Boring machine.	Tifans.	Remarks.
1	Nagpur ...	10	...	...	...	...	6	5	1	2	...	4	...	1	1	...	
2	Bhandara ...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	
3	Chanda ...	...	...	...	...	...	...	...	..	...	...	1	1	...	...	...	
4	Wardha ...	10	...	...	...	1	1	...	10	...	9	6	...	...	...	...	
5	Saugor ...	6	4	...	...	5	...	1	...	...	...	...	1	...	...	4	
6	Damoh ...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	
7	Mandla ...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	
8	Hoshangabad ...	1	...	...	1	5	...	...	...	...	...	...	1	...	...	...	
9	Narsinghpur ...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	..	
10	Betul ...	...	...	...	...	1	1	...	...	...	...	1	1	...	...	...	
11	Chhindwara ...	...	...	...	...	...	...	1	...	...	...	...	1	...	...	...	
12	Nimar ...	...	...	...	...	1	1	...	1	...	...	...	...	...	...	...	
13	Raipur ...	1	...	2	1	8	...	...	...	...	...	...	...	...	...	1	
14	Sambalpur ...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	
15	Akola ...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	
16	Amraoti ...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	
17	Ellichpur ...	1	...	...	...	...	...	...	1	...	...	...	...	...	...	...	
18	Basim ...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	
19	Wun ...	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	
20	Outside Central Provinces and Berar.	1	..	...	...	2	2	3	...	...	...	...	...	...	...	2	
	Total ...	31	5	2	2	24	13	10	14	3	10	12	9	1	1	7	

20. Operations this year were confined to the Betul and Balaghat Districts, which were traversed by a party under the charge of an Assistant to the Agricultural Chemist to the Government of India, with one of our Agricultural Assistants. The

The improved sugar mill and *gur* maker and the analysis of the juice.

economy in the use of fuel and the greater outturn per 100 lbs. of cane effected by the use of the Poona apparatus are brought out in the statement below.

Name of village.	Poona pan and furnace.					Local pan furnace.				
	Weight of canes.	No. of gharas of juice.	Weight of fuel.	No. of gharas of juice per 100 lbs. weight of canes.	Weight of fuel per ghara of juice.	Weight of canes.	No. of gharas of juice.	Weight of fuel.	No. of gharas of juice per 100 lbs. weight of canes.	Weight of fuel per ghara of juice.
1	2	3	4	5	6	7	8	9	10	11
				BALAGHAT.						
Selua	565⅜	6½	...	1·15	...	509½	5¼	...	1·03	...
Saongi	683	11	249	1·61	22·63	358	6	209	1·68	34·83
Naksi	758	8	219¾	1·06	27·47	746	7½	325½	1·01	43·40
Do.	819	9⅗	371	1·17	38·65	403	4⅜	221⅕	1·09	50·27
Mundesara	781	9	...	1·15	..	338	3 7/12	...	1·06	...
Pangaon	1,169	13⅔	...	1 17	...	731	7	...	0·96	...
Bahmangaon ...	1,741	18	...	1·03	...	811	7	...	0·86	..
Lanji	1,935	26	...	1·34	..	1,910	23	...	1·20	...
Do.	1,714	24	...	1·40	...	1,713	20	...	1·16	...
Do.	2,212	29	...	1·31	..	2,119	25	.	1·18	...
Do.	1,720	20¼	...	1·18	...	904	9½	...	1·02	...
Do.	2,725	28¾	...	1·05	...	1,835	21½	...	1·17	...
Do.	1,502	19	...	1·26	...	1,225	16	...	1·31	...
				BETUL.						
Auria	1,545	22	520	1·42	23·64	2,635	35	1,070	1·33	30·57
Jowalkhara... ...	3,080	40	715	1·29	17·87	3,800	45	1,304	1·18	29·00
Dahowa	2,340	27	682	1·15	25·26	3,276	35	1,114	1·07	31·83

An extract from the figures of the analysis prescribed by Dr. Leather is given below: the greater percentage of glucose in the *gur* manufactured by local methods is noteworthy.

Village.	Variety of cane.	Pan employed.	Juice.			Gur.	
			Specific gravity.	Per 100 C. C.		Cane sugar.	Glucose.
				Cane sugar.	Glucose.		
			BETUL.				
				Per cent.	Per cent.	Per cent.	Per cent.
Auria	Engreji ...	Local ...	1·070	15·31	2·04	61·89	21·74
Do.	Do. ...	Poona ...	1·070	14·75	1·77	68·48	14·81
Sowelkheri ...	Pachrangi ...	Local ..	1·068	16·10	0·743	75·95	8·89
Do.	Do. ...	Poona ...	1·070	16·67	0·797	75·73	8·16
Umri	Mungi or Kathai.	Local ...	1·074	16·15	0·932	64·70	16·13
Do.	Do. ..	Poona ...	1·074	16·19	0·916	69·72	11·47
			BALAGHAT.				
Saongi	Do. ...	Local ...	1·074	15·81	1·02	57·84	20·92
Do.	Do. ...	Poona ...	1·074	15·80	1·02	63·25	19·58
Mundesara ...	Do. ...	Poona ...	1·076	15·31	1·28	73 75	7·67
Do.	Do. ...	Local ...	1·076	15·31	1·28	75·47	7·82
Lanji	Dhawari ...	Poona ...	1·084	20·54	0·348	78·05	8·93
Do.	Do. ...	Local ...	1·084	20·41	0·404	72·18	12·80
Do.	Do. ...	Poona ...	1·078	18·89	0·299	81·34	6·75
Do.	Do. ...	Local ...	1·080	18·70	0·294	76 25	10·18

The marked superiority of the Lanji cane attracted Dr. Leather's attention and he has stated that this cane gives a better analysis than any cane he has

yet seen in the whole of India. Efforts will be made next year to discover the reason of this superiority, which is very likely due to the peculiar soil conditions of Lanji. There is no doubt that the Poona pan and furnace are a great improvement on the local methods owing to the use of a furnace grating with the consequent creation of an under-draught, but I believe a somewhat lighter type of iron mill will be more successful than the heavy Poona mill, which takes two pairs of cattle to turn it.

It was hoped that some light would be thrown on the effect of the different types of soil on the chemical composition of the juice, especially in the case of *khari* cane fields of Betul, but, unfortunately, owing to the Assistant in charge not having recorded separately the numbers of the fields whence the cane was cut, no comparison was possible.

Wheat embankments in Hoshangabad and Saugor.

21. In Saugor embankments were made partly by the Irrigation Department with the prospect of a future increment in revenue, and partly by the malguzars themselves from *takavi* or their own resources. A sum of Rs. 15,900 was spent on this under the orders of the Deputy Commissioner. In all cases the system adopted was that of long contour bunds with, in some cases, rice fields below them, irrigable from the embankment above when it is cut to let off the water for ploughing. The advantages of embankment are the increase in the general fertility of the field, the avoidance of the ill effect of dry years and, it is believed, the eradication of kans grass. With reference to the last point, the kans no doubt tends to disappear in embanked fields, but whether from the softening of the soil rendering ploughing more easy or whether from the kans rotting under water is not certain. Considerable areas have been embanked in the Khurai Tahsil, and up till the time when they were attacked by pest, the crops looked most promising. The frosts, however, caused very heavy losses, and it seems that they were especially severe in embanked fields. As frosts intense enough to injure wheat are of very rare occurrence, this disadvantage may be dismissed as negligible.

Seventeen new works were started in Saugor and Damoh and one in the Seoni District by the Irrigation Department, and an expenditure of Rs. 16,759 was incurred on them. Including the completion of works left unfinished last year, a total expenditure of Rs. 31,590 was incurred. When all works at present sanctioned have been completed a cost of Rs. 1,20,590 will have been incurred and 7,354 acres protected, at an average cost of Rs. 16-4-0 an acre. Nine hundred and fifty-eight acres of the protected fields were reported as cropped during the year under report, but, owing to the frost, the produce was very little. One work alone was estimated by cultivators as containing, before the frost came, crops worth Rs. 15,000. The estimated value at harvest time was Rs. 765 only. A year like last, but for the frost, was a good one for wheat, and the above-noted embankment would have far more than repaid its cost in a single year. Fields were embanked last year on the Jubbulpore Haveli system in the Hoshangabad District, but I do not gather that any work was done during the year under report, and I have been unable, in the limited time at my disposal, to obtain any information as to the results.

Demonstration of disposal of sewage on the Meagher system.

22. Demonstrations were given in the application of sewage as manure in the following districts, *viz.*, Jubbulpore, Hoshangabad, Betul, Chhindwara, Nagpur and Wardha, during the year under report. This year an Agricultural Assistant is demonstrating the entire operation from start to finish in the Badnur public garden and in some fields near Betul town. The system is a practical success in the Nagpur Municipality, where the lands are freely taken up by cultivators on rents that tend to increase every year. Apathy on the part of other Municipalities is the only cause of non-success.

Demonstration of the pickling of juar seed with sulphate of copper.

23. This method was explained to the cultivators of Nagpur, Wardha, Chhindwara, Nimar, and in three districts of Berar, and is reported to have been keenly taken up by the cultivators of the latter. Figures showing the areas over which it was practised are not immediately available.

Rust-proof wheat.

The rust-proof wheat at last had a test this year in some of the northern districts. It is reported to have suffered from rust in Mandla and in Jubbulpore. I have already remarked on this when describing the operations of the Nagpur Farm.

Early variety of *tur*.

24. The Nagpur variety of *tur* ripens by the beginning of January or the end of December: and those tenants of Hoshangabad who brought their *tur* seed grain from the Powarkhera Farm entirely escaped the destructive frosts of February 1905. A similar early variety of *tur* is, I remember, grown in the north-west of the Bilaspur District, and it would be interesting to learn if this also was equally fortunate. Large quantities of this early *tur* have been sold this year in the northern districts, especially in Hoshangabad, where there is a great demand for it. In view of the special liability of *tur* to damage from frost, the introduction of the new species is promising. It is a bigger plant than the late variety and has a larger seed.

Campaign against locusts.

25. The western districts of the Province were subjected to an extensive inroad of locusts during the year under report. In May 1904 locusts made their appearance in Buldana and thence spread over the whole of Berar and the western districts of the Central Provinces. They stopped short of the rice tracts. Specimens of the insects which were examined by the Government Entomologist were reported by him to contain immature eggs; the locusts commenced laying about the end of June, and the old brood had disappeared by the beginning of August. In the month of August the hoppers made their appearance and active measures were set on foot for their destruction. Steps had previously been taken to explain to the cultivating classes the methods of destruction, and the affected area had been divided into circles, each under the charge of an officer of the rank of Naib-Tahsildar. Various contrivances for destroying the hoppers were tried: as a rule, the more expensive and elaborate ones were of the least use: and the following were found to be the most efficacious:—

(1) A bag about 10′×6′, like a bolster case closed at each end and open on the long side, dragged over the crops by two men, one holding each end.

(2) A bag with a light bamboo frame for open ground, or with the frame removed and the mouth of the bag held open by two bamboos for crops. This contrivance was successful before the crops grew too high.

(3) Beating with leaves and branches. Locusts in the act of coupling were destroyed in large numbers by this means.

(4) Where crops were too high for the successful employment of any of the above contrivances, pans of kerosine oil were placed here and there in the fields and the hoppers driven into them.

Large numbers of the insects were destroyed by these means and it is generally reported that the measures adopted had an appreciable effect on the numbers. The most effective agent in keeping down the pest, however, was the juari bird, which made its appearance earlier than usual and devoured enormous numbers of locusts. By the beginning of December the remainder of the locusts took themselves off in a westerly direction. It appears not improbable that the prevailing direction of the wind at different seasons was the determining cause of their arrival and disappearance.

Save in the Nimar District, where the locust is a frequent visitor, religious prejudices were responsible for the apathy which the people displayed at the beginning of the invasion. The locust was said to be the horse of Mahadeo, sent by the God to ravage the country as a token of his wrath. The total cost of the operations amounted to Rs. 10,314.

Agricultural associations.

26. The following meetings of the different Agricultural associations were held during the year :—

District.	Number of Meetings.	
	Attended by Assistant Director of Agriculture or Superintendent of Farm.	Not attended by Agricultural experts.
Damoh	...	2
Seoni	...	2
Narsinghpur	...	2
Nimar	...	3
Chhindwara	1	1
Wardha	...	1
Nagpur	2	...
Chanda	1	...
Raipur	1	1
Bilaspur	1	...
Sambalpur	1	...

Very little reporting of results was secured, and it has been suggested by the Deputy Commissioner, Bilaspur, that a printed form for reporting results should be sent with each packet of seed.

The most important results are briefly noted below :—

The ganeri juar was not approved of by the Chhindwara Association who report that it gives a smaller outturn than the local varieties.

Juar did well in Mandla, where it is said to be now well established in one village. It is reported to have been cross-ploughed after (presumably) broadcast sowings, like rice is in Chhattisgarh.

The use of saltpetre as a top-dressing for rice was generally approved, and the same manure for wheat spoken of hopefully in Narsinghpur, though frost and rust vitiated the results. The cross-bred wheat, which is rust-proof in the Nagpur country, is stated to have suffered severely from rust in Mandla. It is the case that a variety which is rust-proof in one district may not prove so under a different set of local conditions. The grain of the wheat is approved generally apart from its rust-resisting properties.

Upland Georgian cotton.

27. In view of the great importance of the introduction of improved varieties of cotton, I could have wished to give in some detail the results obtained from the acclimatized farm seed and from that distributed by the Empress Mills. Unfortunately, however, results are not available in a complete form. I append below an extract from a communication received from the Manager, Empress Mills :—

We bought from the Model Farm 360 lbs. of acclimatized seed and had some of our own from cotton grown the previous year from seed fresh imported by us from America.

They were distributed among persons known to us at Wardha and Hinganghat. A summary of the reports regarding their growth is "that both varieties were sown as kharif crop, exactly as the indigenous seed; that the Model Farm variety did somewhat better than ours; that they did not, however, fare as well as the indigenous, that so long as there

was good rain, for about 6 weeks, the growth was luxuriant and promised better results, the plants growing from 12 to 24 inches in height, but that as soon as the rain ceased and held off for about 2 weeks, the plants began to wither, the lower leaves turning yellow and dropping off, and the rest curling and appearing scorched, most of the bolls being shed and only a few being left on the plants. Such plants as were left in one field were watered and they gave a yield of about 250 lbs. of lint to the acre in 3 to 4 pickings. It seemed as if the plants required watering during the 7th and 8th week of their growth, while the indigenous plants showed no signs of suffering."

At Hinganghat, one of the cultivators finding that the plants were failing, uprooted them and prepared his ground for wheat. Three others complained of loss and we paid them Rs. 64-11 as compensation. Others could give no satisfactory account as to yield, &c., but simply said that if they had sown *jari* instead, the yield would have been 1·75 times. However, the kapas, that is, cotton with seed, which was gathered, realized from Rs. 74 to Rs. 80 per khandy of 9 Bengal maunds when the rate for good Hinganghat buny khapas ranged from Rs. 67 to Rs. 70 per khandy. The khapas yielded about 34 per cent. lint as against 28 per cent of bani. I have given you 28 per cent.; but good pure bani does not give more than 26 per cent. The higher percentage means that there was some small mixture of *jari*. Taking Rs. 65 as the rate of Hinganghat buny kapas giving 28 per cent. lint, the upland Georgian at 34 per cent. ought to realize Rs. 81 per khandy. The rate for *jari* kapas was from Rs. 51 to Rs. 58 per khandy at the time.

The Wardha account is somewhat in more detail and I give it to you as received :—

No. 1 Tookaram Teli at Umri had 36 lbs. of seed which he sowed in 2 acres and obtained 925 lbs. of kapas yielding 325 lbs. of lint which he sold to us for Rs. 103, equal to Rs. 110 per boja of 345 lbs. The rate for bani at that date was Rs. 104 per *boja*. What he did with the seed is not known, but at the ordinary rate of Rs. 8 per khandy, he must be credited with at least Rs. 10 for 1¼ khandy, of 9 maunds each. The yield of lint in this case comes to 35 per cent. He said that if he had sown *jari*, he would have realized Rs. 120. This means that he made a loss of Rs. 7.

No. 2 Jumnadas Potdar, our broker, had 9 lbs. of seed sown in one acre of land which yielded 464 lbs. of kapas which he sold to us at Rs. 75 per khandy, realizing Rs. 46-14. If *jari* had been sown, the yield would have been one khandy, for which he could have realized Rs. 60.

No. 3 Two Kisans at Sirpur had 36 lbs. of seed sown in 2 acres which yielded 944 lbs. of kapas which they sold to us at Rs. 75 per khandy, realizing Rs. 97-4-0. If *jari* had been sown, 2½ to 3 khandies would have been obtained, realizing Rs. 150 to Rs. 180. The average lint obtained from the above two lots of kapas was only 31·4 per cent. The seed has not been sold, as no cultivator would buy it, though hand ginned.

No. 4. Ramji Patel at Umri had ·72 lbs. of seed, but he mixed it up with *jari* and could give no account.

Those who have tried the seed at Hinganhat and Wardha are unwilling to make further experiments.

We had given seed to two persons in Nagpur, but could get no information from them.

Mr. Joshi's opinion is from one or two fields seen by him at Hinganghat, that suitable fields for this variety were not always selected: it requires a soil unusually retentive of moisture. In one field, he said, even the ordinary *jari* cotton, some of which was growing side by side with the American variety, was only a poor crop. The yield ought, he says, to be about 75 per cent. of *jari*: while the price as given by Mr. Bezonji is more than 33 per cent. in excess of the price of *jari*.

While in no way claiming that the acclimatized upland Georgian in any way approaches the best type that we may ultimately hope to reach in India, it appears at present to be the most promising variety we have, and its cultivation should in my opinion be continued. The acclimatized variety which has been grown on the farm for a year appears to give better results than the recently imported seed.

Tree cotton.

28. Samples of the different kinds of tree-cotton grown in the Central Provinces were sent to the Inspector-General of Agriculture: a report was received after the close of the year from Messrs. Shaw, Wallace & Co., regarding the fibres. Of the lot, the Bhandara and Damoh samples appeared the most promising, the latter possessing a one inch staple. It was too late to attempt anything this year, but it is proposed to grow these varieties at the farm with a view to improving them, if possible.

Results of crop harvesting for determination of standard outturn.

29. The number of crop-cutting experiments made during the year was 1,090 as against 962 in the previous year, 613 being made with kharif and 477 with rabi crops. In Mandla the Settlement Officer and his staff made as many as 324 experiments. Among the Deputy Commissioners Mr. L. A. G. Clarke with 26 and Mr. Gaskin with 16 have the best record. A large number of experiments were made for administrative purposes by officers of inferior rank, but these have not been compiled in the Settlement Commissioner's office. Steps are being taken by the Settlement Commissioner to ascertain the proportion of the total area usually covered by *tur* in the mixture cotton-*tur* for the purposes of the cotton forecast in the Central Provinces.

Crop cutting experiments in Berar were hitherto confined to certain taluks in the districts of Amraoti, Buldana and Ellichpur. In accordance with orders issued by the Settlement Commissioner crop experiments have been extended throughout the six districts of Berar and the number made during the year was 177 as against 59 in the previous year, 81 being kharif and 8,196 with rabi crops. Of the 177 experiments 62 were made by Assistant Commissioners.

The results lose a good deal of the interest they might have owing to the inexact record of soils on which the crops cut were grown.

In the belief that the linseed forecasts now err considerably on account of a single standard outturn being assumed for both "*utera*" and "*nari*" linseed and with the object of correcting this error, he is also arranging to obtain separate area statistics for these two varieties in order to apply a separate standard outturn to each. In spite of the repeated request that special attention might be paid to *ringni* or cold-weather *juar*, only five experiments were made in this crop.

IV.—HORTICULTURE.

Public gardens.

30. The services of Mr. Leslie, a trained gardener, were obtained for the post of Superintendent during the year, and several improvements, especially the walling in of the north side of the garden along the road to Sitabuldi, were carried out. The year was a most unfortunate one for the menagerie—various mishaps, preventible or otherwise—deprived the gardens of a tiger, a bear, a hyæna and several stags. Plans for a new monkey-house and an aviary, on somewhat more pretentious lines than the existing buildings, are under consideration. A considerable improvement in the receipts occurred during the year. Proposals have been submitted for an increase in the pay of the staff which was fixed at a time when local labour did not command more than half the rate that it does at present.

It is hoped when an Overseer for the various Nagpur gardens has been obtained, to allow Mr. Leslie to pay visits to the different District and Jail gardens, where, no doubt, his advice will be very welcome

A great deal of damage was caused by frost to the fruit and vegetable crops at the Pachmarhi gardens, but save for this misfortune the results were satisfactory.

District gardens, especially in the north of the Province, also suffered from frost. The increase in the number of trees distributed from 5,225 to 5,645 was again satisfactory. The distribution of trees to schools for planting on Arbor Day is said to have induced several malguzars in Wardha to plant trees. There have been numerous complaints of the difficulty of obtaining competent gardeners, but, as a matter of fact, the shortcomings of district gardeners are more often due to laziness and lack of interest than to incompetence.

The free distribution of seed for school gardens was an important feature of the year's work. This is at present on an unsatisfactory basis. The annual indent should be consolidated, as much trouble is caused at present by the receipt of separate requisitions, and a beginning might be made in supplying the demand of the District schools from one or two of the District gardens. As soon as Mr. Leslie is set free from the immediate charge of the Nagpur gardens, his attention will be directed to this matter.

V.—VETERINARY.

31. The post of Superintendent was held by Mr. S. J. Jethiji for all but one month at the beginning of the year. Two Inspectors were appointed during the year for the Central Provinces, but they only worked for a short portion of

the year. The two Berar Inspectors remained on duty for the whole year. Their most important functions were the inspection of dispensaries, the collection of information regarding the breed of cattle, and the treatment of specially serious outbreaks of disease.

The number of Veterinary Assistants employed during the year under report and the preceding year are :—

	Central Provinces.	Berar.
1903-04	17	17
1904-05	30	21

Five new dispensaries were opened in the Central Provinces during the year and four in Berar : and another in each since its close. This gives 18 dispensaries in the Central Provinces and 22 in Berar. The latter has now a dispensary for each taluk, and all that is required is to provide all the Berar dispensaries that need it with touring Veterinary Assistants.

The grant of Rs. 25,000 sanctioned in Secretariat letter No. 4577, dated the 28th April 1905, for the construction of Veterinary dispensary buildings was fully disbursed during the year. Buildings at 12 district head-quarters were either completed or are still in progress : while plans and estimates for the buildings at Bhandara and Chanda are awaited. Rupees 8,940 were made over to the Public Works Department and the balance was allotted to the District Councils who were able to undertake the construction themselves.

32. Turning now to the work of the Department, it appears that the number of cases treated at Dispensaries and on tour this year and last year were as under :—

		At dispensaries.	On tour.
1903-04 ...	Central Provinces	11,780	10,912
	Berar	14,215	2,624
1904-05 ...	Central Provinces	15,719	11,404
	Berar	15,024	5,630

These figures show steady progress. The chief difficulty found by Mr. Jethiji is the delay in the receipt of reports by the Veterinary Department. So long as the routine described in paragraph 4 of Mr. Standen's letter forwarding last year's report is maintained, it seems to me a matter for some wonder that the patwari's report, after passing through so many hands, ever arrives in time to be of any use at all.

The difficulty at present is to compel the patwaris to submit their reports promptly and direct to the Veterinary Assistant, and I have found that local inspection by Superintendents of Land Records and Tahsildars with prompt punishment for gross negligence has had some effect.

33. 3,773 animals were inoculated during the year in the Central Provinces and Berar against 1,823 last year, and that in spite of the fact that outbreaks were fewer. This is a most satisfactory practice, and to enable further progress to be made prompt reporting and the explanation to the people by officers on tour of the advantages of inoculation are alike necessary. Mr. Jethiji has displayed much energy in making arrangements for the instruction of Veterinary Assistants in practical inoculation work and with good results.

The eagerness with which the kotwar seeks for the hides of dead cattle as his perquisite has been responsible to my own knowledge in at any rate one case for the spread of disease. There are other objections to the practice which is a condition in the wajib-ul-arz. It is rapidly becoming out of date, in consequence of the increased value of hides and the lessening of caste prejudices, and should, in my opinion, be allowed to die a natural death : the refusal of Deputy Commissioners to enforce that condition by executive orders would tend to this result.

34. Mr. Jethiji has not much to say on the subject of cattle-breeding and as I have only held charge of the Department for a few days I am unable to supplement his report from my own experience. The cattle at the Telinkheri Farm appear to be a nice level lot, and true to type. I understand that the Gaolao breed was in process of serious deterioration when the Government cattle farm was started: the distribution of bulls, which will shortly commence, should go far to arrest this, provided persons will come forward to accept and loyally abide by the conditions that will be imposed. It is proposed by the Deputy Commissioner of Mandla to attempt to improve the Mandla breed; and I have suggested to him the Gaolao as a cross. The Mandla animal is a large and rather weedy brute, and a cross of the more powerful and better filled out Gaolao should be beneficial.

VI.—METEOROLOGICAL DEPAKTMENT.

Co-operation with enquiry under Imperial control.

35. A report on the efficiency of the registration of rainfall was submitted to the Meteorological Reporter to the Government of India with Settlement Commissioner's letter No. 3231-III-107, dated the 12th June 1905. During the year under report two new rain-gauge stations were established, one at Marpra in the Mandla District and the other at Garchiroli in the Chanda District, and two rain-gauges (Ambagarh Chowki and Allapalli) in the Chanda District were provincialized. No rain-registering station was abolished during the year under report. The number of rain-gauges maintained in the Central Provinces during the year was 92, of which 12 are observatories under the superintendence of the Meteorological Department. Of the remaining stations which are under the supervision of this Department, 13 are under the management of the Medical Department, 16 are maintained by Feudatory States, while the rest are either in charge of Kanungos, Police Muharrirs or Hospital Assistants. The success attained in the registration of rainfall during the year is very satisfactory. There were only 3 cases against 12 last year in which the weekly rainfall returns received from the Deputy Commissioners and Feudatory States were found incorrect. The number of inspections of rain-gauge stations during the year, of which reports were received in this office, was 76 against 92 in the preceding year and 106 in the year 1902-03. The rain-gauge stations which were not inspected during the year are Marpra (Mandla), Rajim (Raipur) and Shapur (Betul). The number of rain-gauges inspected by Tahsildars was 87 against 94 in the year preceding. The Tahsildar of Bhandara appears to have made some inspections, but the number has not been reported by the Deputy Commissioner. The defects generally found were improper state of the rim of the funnel, the low position of the mouth of the funnel and the failure to maintain the standard height of the railing. It was found necessary in only one case to remove the gauge to a more suitable site. The number of rain-gauge stations maintained in Berar during the year was 44. No rain-gauge station was established nor was any abolished during the year. The rain-gauges at Pusad (Basim District) and Panderkaora (Wun District) were removed to more suitable sites. The number of inspections of rain-gauge stations during the year was 116 against 87 in the preceding year. The weekly rainfall tables for Berar are now published in the Gazette. In conformity with the sanction conveyed in Secretariat letter No. 8038, dated the 17th December 1904, the system of rainfall registration in Berar has been brought into conformity with that obtaining in the Central Provinces. The results attained during the year under report are fairly satisfactory.

Co-operation with the Agricultural Chemist to the Government of India.

36. Reports were received during the year from the Agricultural Chemist to the Government of India regarding the following oil-seeds.

Tilli seed.—The result of the analysis of the various samples showed so marked a superiority in favour of the Dharwar variety that the seed was obtained and tried on the Nagpur Farm. An analysis of the seed of the crop so obtained, however, gave very poor results.

Mustard seed.—The analysis of the local mustard showed that they were at least equal to those of the Punjab.

Reports were also received giving the analysis of castor, linseed, safflower, groundnut and jagni (*Guizotia abyssinica*). In the case of linseed and safflower seed was sent from Nagpur to districts, whence the specimens sent to the Agricultural Chemist gave a low percentage of oil. The crop grown from these seeds gave results superior to those of the local variety.

Co-operation with the Reporter on Economic Products.

37. At the instance of the Reporter on Economic Products to the Government of India, the following collections were made:—

(*a*) Tubers and botanical specimens of yams grown in the districts of the Central Provinces and Berar continued to be sent to him during the year and several of them have been identified, while others have been registered and preserved for reference in the Economic Herbarium, Calcutta.

(*b*) The collection of botanical specimens of gums was continued and a large number of specimens was identified by the Reporter. Several of these served to authenticate the specimens previously received and registered by him.

(*c*) Samples of juar grown in the Amraoti, Buldana, Ellichpur and Wun Districts of Berar were sent to the Economic Museum to be added to the specimens which is being collected for the preparation of an Agricultural Ledger now in hand.

(*d*) As the collection of bees sent last year to the Reporter on Economic Products was received in a decomposed state and it was impossible to determine their species with certainty, a fresh collection was made and sent from Hoshangabad. It was reported to contain five species, three of which were identified as having been previously included in the Agricultural Ledger while the remaining two proved to be new species.

VII.—Museums.

38. There are only two Museums in the Province, *viz.*, the Provincial Museum at Nagpur and the local one at Raipur. The daily average number of visitors to the Nagpur Museum was 215 against 271 in the previous year, the decrease being largely due to the Museum having been closed for about seven weeks while the building remained under repairs. The ceilings were renewed and the wall repainted, and at the suggestion of Mr. Cousens, Superintendent of the Archæological Survey for Bombay and Berar, shallow shelves were provided in the hall at the west end for the reception of small statues. The principal additions to the Museum consists of some tussar silk cloths manufactured at Sambalpur, Bilaspur and Chanda, and 111 coins presented by the Government of the United Provinces of Agra and Oudh, the Bombay Branch of the Asiatic Society, the Commissioner of Berar and the Deputy Commissioners of Saugor and Wun Districts. It is satisfactory to record here that the Museum was awarded two silver medals by the Madras Fine Arts Exhibition, one for the tussar silk collection and the other for Burhanpur saris. A certificate was also granted by the same institution commending the leather embroidery work of Chanda.

The number of visitors to the Museum at Raipur has fallen from 116,956 to 88,249 during the year.

The Museum fund opened with a balance of Rs. 605 and closed with a balance of Rs. 1,647, or Rs. 1,042 in excess of the previous year. This is due to a special grant of Rs. 500 having been made by the Local Administration for the purchase of exhibits. It is under contemplation to start a stone-carving establishment in connection with the Museum and steps are being taken to obtain a Hattersley hand-loom with a view to demonstrate weaving.

VIII.—GENERAL.

Tussar silk cultivation.

39. Mr. N. G. Mukerji, Assistant Director of Agriculture, Bengal, has submitted his report on tussar cultivation in the Central Provinces. He finds that tussar cultivation is deteriorating, owing to the increasing difficulty found by the growers in obtaining wild cocoons, and to their reluctance to use the large hard cocoons which give the best seed, owing to their irregular and often long delayed eclosion. His proposals are, briefly, the procuring of wild cocoons through the agency of the Forest Department from certain specially reserved areas where the wild strain is not likely to be affected by the proximity of semi-domesticated moths; this wild stock should be bred for sale at a few selected centres, two in Bengal to start with, and if these are successful, then in two more in the Central Provinces, one at Jharsoguda and one near Gondia. At these centres the worms would be fed on trees planted at some distance apart, to ensure light and air and the rapid drying up of dew and rain. The present system of rearing the semi-domesticated worms in forest areas, where the trees are too close together, is stated to be a fertile source of disease, while the pollarding seriously injures the forest. Mr. Mukerji has some interesting remarks on the nature and causes of the various diseases of the local worms. He does not discuss the possibilities of rearing the worms under complete domestication, which in the case of the castor-eating Assam moth has been successfully tried on a small scale in the Central Provinces, nor has he entered into the question of the probable market for a largely increased production of tussar fabrics. It appears at any rate doubtful whether the Forest Department will be able to supply cocoons of the better qualities in sufficient numbers to meet the demand for seed that the proposed measures will entail. The statement below exhibits the marked superiority of certain varieties of Bengal cocoons to any species found in the Central Provinces and the differences that occur among the local varieties:—

	Name of District.	Species.	Number of cocoon shells in 1lb.
BENGAL	Singhbhum	Barra Muga	128
	Do.	Ampatia Dula	256
	Barabhum	Wild Muga	213
	Manbhum	Ampatia Naria	640
	Bankura	Wild Muda	160
	Sonthal Parganas	Do.	192
CENTRAL PROVINCES.	Bilaspur	Wild seed cocoons	200
	Chanda	Do.	380
	Do.	Home-grown cocoons	520—560
	Raipur	Wild cocoons found on sal trees.	186
	Bhandara	Wild cocoons, other trees	480

Our Agricultural Assistant who was sent to Bangalore to learn the Japanese system of reeling has returned and was sent to Sambalpur, where he prepared some silk skeins according to the Japanese method. They have been seen by Mr. Mukerji who states that the Japanese method is about five times as rapid as the Sambalpur method of reeling; but it results in the production of raw silk, and it is uncertain if these will be suited for the kind of fabrics produced in Sambalpur where twisted yarns are required. The Assistant is now on tour in Bengal where he is to see the local methods of reeling.

Fly-shuttle loom.

40. A class was opened at the Jubbulpore Reformatory School on the 30th April 1904 and four candidates were instructed in the use of the fly-shuttle for two months, by the end of which time they became proficient. The candidates, however, appear to have been unsuitable persons, whose main reason for learning the use of the fly-shuttle appears to have been the fact that they could not make a living at their own trade. They are said to have discontinued its use after leaving the class and to have taken employment in the Bombay Mills.

A second batch of four candidates were instructed up to the end of September and plague caused the break up of the class before three of the men had become proficient. The one man who had qualified was given a loom gratis, but he too left Jubbulpore during the plague epidemic and it is not known what became of him.

Rupees 151-0-4 were spent on the subsistence allowance to the weavers and on the pay of the instructor and Rs. 57 on the purchase of five fly-shuttle looms.

Looms were sent out, accompanied by reformatory boys trained in their use, to the Chunar Reformatory and to the Menonite Mission at Janjgir. Looms were also working at the Garhakota fair, at Saugor, and at the Bombay Exhibition. I am addressing the Superintendent, Jubbulpore Reformatory, regarding the continuance of the experiment.

I have the honour to be,

Sir,

Your most obedient Servant,

C. E. LOW,

Director of Agriculture.

Sectt. Press, Nagpur :—No. 1177 R.D., 4-9-05—650.

STATEMENT A.

Statement showing the number of Agricultural Stock in each District of the Central Provinces and Berar during the Agricultural year ending the 31st May 1905.

	Districts.	Bulls and bullocks.	Cows.	Male buffaloes.	Cow buffaloes.	Young stock (calves and buffalo calves).	Sheep.	Goats.	Horses and Ponies.	Mules and Donkeys.		Camels.	Ploughs.	Carts.	Total of columns 2—12.
										Mules.	Donkeys.				
1		2	3	4	5	6	7	8	9	10	11	12	13	14	15
Jubbulpore Division.	Saugor ...	138,335	150,018	3,853	68,261	190,323	17,357	28,375	8,737	94	1,276	15	49,149	15,261	606,645
	Damoh ...	111,269	102 732	3,658	40,521	103,312	16,484	34,388	5,198	32	1,936	7	41,975	6,558	419,537
	Jubbulpore ...	190,327	134,254	9,341	48,804	164,002	15,354	45,798	11,470	123	441	11	76,873	6,191	619,925
	Mandla ...	123,087	169,622	7,363	34,563	56,986	2,186	16,123	4,933	...	11	...	43,226	1,612	414,874
	Seoni ...	132,008	119,616	11,166	29,902	69,549	887	22,880	6,017	15	210	17	43,068	18,615	392,267
	Total Jubbulpore Division ...	695,026	676,242	35,381	222,051	584,172	52,268	147,564	36,355	264	3,874	50	254,291	48,237	2,453,248
Nerbudda Division.	Narsinghpur ...	72,658	54,772	3,355	22,738	88,933	7,747	33,808	6,226	43	3,340	8	28,172	13,577	323,628
	Hoshangabad ...	136,052	88,457	5,211	35,061	129,858	8 328	40,605	4,261	65	2,032	176	36,736	30,940	450,106
	Nimar ...	114,435	83,866	3,840	38,247	71,281	1,930	44,726	2,636	13	1,210	1	34,619	30,219	362 185
	Betul ...	121,265	92,296	4.377	20,614	107.124	5,931	48,016	6,028	2	569	7	37,435	17 407	406,229
	Chhindwara. Khalsa ..	138,633	106,626	3,818	31,033	101 589	5,605	65,352	7,748	10	828	10	43 535	24,546	461,252
	Chhindwara. Jagirs ...	22,669	25 296	986	5 326	27,094	1,084	7,048	1,443	...	42	6	9.405	637	90.994
	Total Nerbudda Division ...	605,712	451 313	21,587	153.019	525,879	30.625	239,555	28,342	133	8,021	208	189 903	117,326	2,064.394
Nagpur Division.	Wardha ...	137,737	98,126	5,038	28,139	59 479	17,788	71,147	2,858	2	2.529	1	20,593	30 036	422,844
	Nagpur ...	234,400	147,523	6,107	35,244	85.532	38,177	125,081	4.311	35	2,541	22	46 636	43 483	678,973
	Chanda ... Khalsa ...	153.521	174.312	12,259	33.710	75,666	60,439	93,608	877	2	128	...	54,390	43.116	604,522
	Chanda ... Zamindari ..	37,483	59,076	7.719	6,612	36,785	511	14,571	195	...	...	...	5,143	7,531	162,952
	Bhandara ... Khalsa ...	102,780	88,070	13,077	19,536	95,990	4,632	127,536	1,081	...	87	...	50,486	34,494	452,789
	Bhandara ... Zamindari ...	52,795	38,963	13.491	4,894	18,848	254	19,120	554	...	...	...	30 344	20,751	148 899
	Balaghat ... Khalsa ...	66,178	45.579	16,088	7.454	31,359	54	18,440	937	2	...	...	34,368	20,881	186,091
	Balaghat ... Zamindari ...	18,918	17,057	5,013	2,223	13,884	125	7,047	354	...	...	...	9,673	4,896	64,621
	Total Nagpur Division ...	803,812	668,706	78,792	137,812	417 543	121,960	476,550	11,167	41	5 285	23	251,833	205,058	2,721,691

Statement showing the number of Agricultural Stock in each District of the Central Provinces and Berar during the Agricultural year ending the 31st May 1905.—(Concld.)

	Districts.	Bulls and bullocks.	Cows.	Male buffaloes.	Cow buffaloes.	Young stock (calves and buffalo calves).	Sheep.	Goats.	Horses and Ponies.	Mules and Donkeys.		Camels.	Ploughs.	Carts.	Total of columns 2—12.
										Mules.	Donkeys.				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Chhattisgarh Division.	Raipur ... Khalsa ...	364,050	276,568	94,527	26,124	244,729	44,516	84,674	7,768	...	7	...	135 476	47,199	1,142,963
	Raipur ... Zamindari ...	110,118	90,951	17,551	10,174	97,740	11,957	26,370	1,840	...	30	...	38,858	10,419	366,731
	Bilaspur ... Khalsa ...	300,570	178,881	56,551	18,004	193,125	15,107	50,678	5,898	...	7	...	83,652	17,376	818,821
	Bilaspur ... amindari ...	92 252	107,565	21,727	7,199	103,715	2,243	34 793	2 460	...	32	1	40,033	9,811	371,987
	Sambalpur ... Khalsa ...	149 101	75,084	24,311	4 341	56,209	9.596	17,695	1,095	...	16	...	80,822	9,683	337,448
	Sambalpur ... Zamindari ...	106,451	81,363	20,626	7.541	89.966	7,139	27,219	1,209	...	47	...	62,085	12,070	341,561
	Total Chhattisgarh Division ...	1,122,542	810,412	235,293	73,383	785,484	90,558	241,429	20,270	...	139	1	440,966	106,558	3.379,511
	Total for the Central Provinces ...	3,227,092	2,606,673	371,053	586,265	2,313,078	295,411	1,105,098	96,134	438	17,319	283	931 796	477,219	10,618,844
Berar Division.	Akola ...	119,061	50,341	4,536	27,267	49,026	23,388	120,105	3,696	5,469	...	13	8,426	39,026	402,902
	Amraoti ...	131,255	56,564	3,736	30,893	55,262	33,937	98,959	4.394	2	3,739	102	10.969	44,734	418,843
	Basim ...	101,241	78,835	2,752	26,658	37,972	17,622	61,161	3,003	...	1,576	55	21,850	13,491	330,875
	Buldana ...	126,461	52,974	6,067	25,292	50,481	60,704	101,042	4 984	...	2,824	21	16,044	25,130	430,850
	Ellichpur ...	60,866	27,611	3,121	11,774	14 780	4,748	60,411	2,105	...	2,058	45	10,255	17,672	187,519
	Wun ...	108,789	197,048	2,635	97,966	31,276	39 971	82,807	3,887	...	1,624	8	34,159	28,243	566,011
	Total for Berar ...	647,673	463,373	23,847	219,850	238,797	180,370	524 485	22,069	5,471	11,821	244	101,703	168,296	2,337,000
Grand Total for Central Provinces and Berar.		3,874,765	3,070,046	393,900	806,115	2,551,875	475.781	1,629,583	118,203	5,909	29,140	527	1,033,499	645.515	12,955,844

STATEMENT B.

List of Agricultural Implements which have been tested in the Central Provinces during the year ending the 31st March 1905.

No.	Name.	Use.	Special advantage.	Price.	Where procurable.	Opinion of official reporter.	Extent to which used by native agriculturists.
				Rs. a. p.			
1	*Swedish Plough* ...	Ploughing and inverting the soil.	Efficiency in ploughing and inverting the soil, especially in breaking up grass lands.	16 0 0	Ankerbank's Red Shop and Company, Olsverums, Sweden.	A most useful plough for black soil. Has continued to do very good work on the Nagpur Farm.	A considerable number has been sold by the Nagpur Farm.
2	*Mayfürth's Hand-Thresher.*	Threshing any crop except juar.	Cheapness and rapidity in threshing crops.	199 0 0	Mayfürth and Company, of Frankfort-on-Maine, Germany.	A useful instrument ...	Has not been taken up by native cultivators.
3	*Macarthy Hand Cotton Gin.*	Ginning cotton ...	Rapidity in ginning and saving of labour.	220 0 0	Messrs. N. D. Maxwell and Company, Bombay	An excellent small gin which works satisfactorily and does not injure the seed.	Do. do.
4	*Poona 3-roller Iron Sugar Mill.*	Surgarcane crushing ..	A copy in iron of the ordinary wooden mill, which is easily worked and very efficient.	160 0 0	Superintendent, Experimental Farm, Poona.	Simple in construction and strong. Strongly recommended.	One has been sent to Betul District.
5	*Poona Evaporating Sugar Pan.*	Preparing gur from surgarcane juice.	A shallow pan of improved shape	30 8 0	Do., do. ...	Strong. Highly recommended ...	One has been sent to Betul.
6	*Fanning Mill* ...	Winnowing all varieties of grain.	Easily worked by hand; gives large outturn and separates grain from husk and dirt.	136 0 0	Harder and Company, Empire Agricultural Works, Cobleshill, New York.	The best winnower yet tried ...	Native cultivators are commencing to ask for this machine, which allows them to winnow grain without waiting for a breeze.
7	Marvin-Smith's round-about gear, two-bullock power.	Working all kinds of agricultural machinery.	A useful power machine easily worked with bullocks.	210 0 0	Messrs. Marvin-Smith and Company, United States, America.	Recommended ...	A few have already been sold.
8	Marvin-Smith's four-horse power round-about bullock gear.	Do. do. ...	A more powerful machine ...	320 0 0	Do., do. ...	.. ...	Two have been ordered in the Nagpur and one in the Chhindwara District.
9	Bucket Pump ...	Spraying fruit trees with insecticides and fungicides.	A fairly efficient spraying machine.	10 0 0	America ...	Works well ...	.....
10	Perfection sprayer ...	Spraying small plants ...	A very cheap sprayer ...	2 8 0	Do. ...	Works satisfactorily ...	Many have been sold.
11	Granger seeder ...	Broadcast sowing of seed.	Sow seed broadcast over a large stretch of land.	10 0 0	.....	Requires practice to work evenly...	Seven have been sold in Seoni.

List of Agricultural Implements which have been tested in the Central Provinces during the year ending the 31st March 1905.—(Contd.)

No	Name.	Use.	Special advantage.	Price.	Where procurable.	Opinion of official reporter.	Extent to which used by native agriculturists.
				Rs. a. p.			
12	*Fodder cutter and shredder.*	Cutting juar stalks into short pieces.	Rapidity in cutting juar stalks (karbi) into small lengths, the whole of which cattle are able to consume.	215 0 0	Harder and Company, Empire Agricultural Works, Cobleshill, New York.	A very useful implement for cutting juar stalks into quarter-inch bits, which cattle eat with great ease. It effects a great saving in fodder as nothing is wasted. It cuts very fast and is easy to work. A man working at the machine for half-a-day can produce chopped food for 30 head of cattle. It is also a very good machine for chopping maize stalks. A very sweet sillage can then be prepared out of this material that would otherwise be wasted.	A considerable number have been sold at the Nagpur Farm.
13	Hand fodder chopper ...	Do. do. ...	Do. do. ...	15 0 0	Messrs. Marvin-Smith and Company, America.	A useful hand implement for a small cultivator.	A demand has already arisen, but it is simply because it is cheap. In my opinion it is of no use.
14	*Cooke's turn-wrist plough.*	Ploughing and inverting the soil.	Has the special advantage of working along the furrow in both directions.	72 0 0	Cooke and Sons, England.	A very strong plough which gives work equal to the Swedish plough No. 1 and has the additional advantage of working along the furrow in both directions. It gave excellent results in breaking up waste land, but its price is too high for native cultivators.	
15	Kent's corn planter ...	Sowing maize ...	Dibbling can be done very efficiently.	5 0 0	Messrs. Marvin-Smith and Company, United States of America.	Works fairly well.	
16	Mathews' combination drill, double-wheel with hoe.	Sowing and hoeing the crops of very small areas.	Man works this machine. The difficult attachments for sowing, hoeing, raking, and ploughing can be fixed when the operator wants it.	35 0 0		A useful implement for sowing and weeding kharif crops, but is more suitable for garden than field work.	Nine have been ordered for District Gardens.
17	*Corn sheller* ...	Shelling maize ...	Separates the seeds from the cob very efficiently without injuring them.	10 0 0		A useful little instrument that saves much labour.	Five have been sold in Wardha.
18	Diamond hay press ...	Baling grass ...	Presses compact, handy bundles of hay. Worked by bullock power.	625 0 0	Marvin-Smith & Co., of America.	Much better than the presses worked by manual power. Can press 20,000 bales in one day with the help of 3 men, 2 women and 2 bullocks.	Has not yet been taken up by cultivators.

19	*Junior feed-cutter* ...	Cutting juar stalks into short pieces.	Rapidity in cutting juar stalks (karbi) into small lengths, the whole of which cattle are able to consume.	35 0 0	Marvin-Smith & Co., of America.	A useful hand implement for a small cultivator, much better than No. 13.	Demand has already arisen, but it is a very weak machine and if it were carelessly handled, it is sure to go out of order in a short time.
20	*Tread power* ...	Working all kinds of agricultural machinery.	A useful power machine easily worked by bullocks, which require training in the beginning.	600 0 0	Harder & Co., Cobleshill, New York, America.	A useful machine on the farm worked by two bullocks. Bullocks have only to walk upon inclined plain to work it, unlike as in Nos. 7 or 8, where they have to exert a dragging strain in pulling horizontally. A machine not intended for ignorant cultivators.	Not yet taken up by cultivators.
21	Harder's round-about four-horse gear.	Do. do. ...	Same as No. 8 ...	283 0 0	Do., do. ...	Stronger in make than No. 8 ...	Two have been ordered in Nagpur. Worth recommendation.
22	*Harder's thresher* ...	Threshing any crop except juar.	Rapidity in threshing crops worked by tread power only. No. 20.	225 0 0	Do., do. ...	Excellent worker. Requires two horse power.	Not yet taken up by cultivators as it can be worked very easily by tread power only.
23	*Cooke's cultivator* ...	Scarifying the soil ...	Very useful to up root the stumps of juar and cotton crops.	60 0 0	Cooke and Son, England.	Recommended to be worked in fields which are overgrown with many weeds and which have many stumps.	Not yet taken up. It is really a very useful implement if the cultivators were to know its advantages. The Assistant Director has had no opportunity to show its working. This implement is very useful for preparing the ground for rabi although overgrown with any kind of needs. But the cost is high.
24	*Ransome's turn wrist plough.*	Ploughing and inverting soil.	Same as No. 14 ...	47 0 0	Ransome and Sons, England.	Same as No. 14 ...	Two in Hoshangabad, one in Berar, one in Nagpur have been sold. They are really good implements worth trying in breaking up new land as well as deep ploughing in the hot weather. A competition was held in Berar at Malkapur to prove the advantages of it over the country plough worked by 2 or 3 pairs of bullocks. The plough was winner in the competition.
25	Portable tool-grinder ...	Sharpening the edges of tools.	A nice handy machine for sharpening scythes and other agricultural tools.	11 0 0	Marvin-Smith and Co., America.	Recommended to cultivators and carpenters.	One has been ordered in Nagpur.

Sectt. Press, Nagpur :—No. 1177 Agr.—29-9-05—650.

REPORT

ON THE WORKING OF THE

DEPARTMENT OF AGRICULTURE

OF THE

CENTRAL PROVINCES

DURING THE YEAR ENDING

31 ST MARCH 1906.

Agents for the sale of Books published by the Central Provinces Administration.

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E. A. ARNOLD, 41 & 43, Maddox Street, Bond Street, W., London.

CONSTABLE & CO., 16, James Street, Haymarket, W., London.

P. S. KING & SON, 9, Bridge Street, Westminster, S. W., London.

KEGAN PAUL, TRENCH, TRÜBNER & CO., Charing Cross Road, W. C., London.

B. QUARITCH, 15, Piccadilly, W., London.

GRINDLAY & CO., 54, Parliament Street, London, S. W.

DEIGHTON BELL & CO., Cambridge.

B. H. BLACKWELL, 50 and 51, Broad Street, Oxford.

HENRY S. KING & CO., 65, Cornhill, E. C.

ON THE CONTINENT.

FRIEDLANDER & SOHN, 11, Carlstrasse, Berlin.

OTTO HARRASSOWITZ, Leipzig.

KARL W. HIERSEMANN, Leipzig.

ERNEST LEROUX, 28, Rue Bonaparte, Paris.

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N. B. MATHUR, SUPERINTENDENT, NAZAIR KANUN HIND PRESS, Allahabad

SUPERINTENDENT, AMERICAN BAPTIST MISSION PRESS, Rangoon.

MANAGER, GENERAL BOOK DEPÔT, Nagpur and Jubbulpore.

A. M. & J. FERGUSON, Booksellers, Ceylon.

CENTRAL PROVINCES ADMINISTRATION.

Agriculture Department.

No. 504—XIII—18-3.

Nagpur, the 14th December 1906.

READ—

Report on the Department of Agriculture, Central Provinces, for the period from the 31st March 1905 to the 30th June 1906.

READ ALSO—

Report on the Agricultural Stations for the same period and letter No. 3284, dated the 10th October 1906, from the Director of Agriculture, forwarding the same.

Report on the working of the Provincial, District and Court of Wards Gardens for the same period and letter No. 3536, dated the 1st November 1906, from the Director of Agriculture, forwarding the same.

RESOLUTION.

The last report on the Department of Agriculture referred to the year ending the 31st March 1905, while the present report covers the period from the 31st March 1905 to the 30th June 1906. During this period the Department was under the control of the Commissioner of Settlements and Agriculture up to the 27th July 1905, when Mr. C. E Low, I. C. S., assumed charge as the first Director of Agriculture. He was succeeded on the 16th February 1906 by Mr. L. E. P. Gaskin, I. C. S., the present Director. The report on the Department was due on the 15th September, but was not received until the 30th October, while the report on Provincial and District Gardens was not received until the 3rd November. The delay has not been satisfactorily explained. It was hoped that on the appointment of a separate Director of Agriculture the annual reports would be submitted without delay, and the Chief Commissioner must insist on the observance of greater punctuality in future.

2. The organization of the superior staff of the Department has been materially advanced by the sanction of the Secretary of State, first to the appointments of an expert Agriculturist as Deputy Director of Agriculture and of an Agricultural Chemist, and subsequently of an Agriculturist with general training, to be the Principal of the Agricultural College, and of an Economic Botanist.

The posts of Deputy Director and Agricultural Chemist were filled up during the period under report, and the Principal of the College has recently arrived in Nagpur and taken charge of his duties.

The staff of Agricultural Assistants is the same as last year, and is at present employed on a temporary basis. A scheme for the creation of an adequate graded staff has now been formulated and is under consideration. This scheme provides for one supervisor for every Division and an assistant for every District, in addition to the men required for work at agricultural stations, and, when sanctioned, will have a marked effect in stimulating the activity of the Department and increasing its field of operations.

3. The Agricultural School has shown no signs of any natural growth or increased popularity. Two years ago it was remarked by the Commissioner of Settlements and Agriculture that, if the number of students passing out of the school were increased three-fold, employment could be found for them all. In previous years' reports doubts have been expressed as to the efficiency of the staff, and these doubts are shared by the present Director. The attendance at the school is now no better than in previous years, and the fact that many of the students who joined at the beginning of the year left shortly afterwards seems to indicate either the existence of some serious defects in the arrangements of the

institution or a lack of personal interest on the part of the staff. The appointment of a qualified officer as Principal and the raising of the status of the school will effect a much-needed improvement. The number of schoolmasters attending the Normal classes is about the same as in the previous year, but a larger proportion of them passed the prescribed examination. In last year's report the necessity of remodelling the lines on which these classes are worked, so that they might attain their object more fully, was alluded to; but so far no action has been taken. This is a matter which should engage the attention of the new Principal. There has been a slight decrease in the attendance at the class for training the sons of land-owners. The Chief Commissioner considers that this class is capable of producing far-reaching results of great usefulness. The Principal should endeavour to keep in touch with the more promising members of this class after they leave the school, and ascertain to what extent they make practical use of the knowledge they have obtained and of the training that has been given them.

4. The Agricultural Gazette continues to be published regularly and its circulation has slightly increased. Its numbers contain articles on various subjects of interest to the agricultural classes, and the issue of such a publication appears to be appreciated and to meet a distinct want. The proceedings of the Agricultural Associations, which are recorded in the Gazette, show that in many places these Associations are doing useful work in distributing seed and comparing the results of experiments made at the suggestion of the Department. A remarkable instance of the interest taken in the work of the Associations was afforded at the meeting in Jubbulpore in September last, when, on a proposal being made to establish a demonstration farm near to Jubbulpore, no less than four of the members volunteered to place the necessary land at the disposal of the Association.

5. In July 1905 an assignment of Rs. 1,40,000 was made by the Government of India to cover the additional expenditure on objects most immediately required for the expansion of the Agricultural Department in the Central Provinces, and a corresponding assignment of Rs. 80,000 was at the same time made for Berar. Out of the total grant Rs. 1,75,000 was spent before the end of the financial year. The chief measures undertaken during the year were in connection with the extension of the experimental stations. It was decided to make no addition at present to the area of the station near Raipur, but 189 acres were acquired at Nagpur and 176 acres at Hoshangabad for the extension of the stations at these places, and 271 acres were acquired near Akola for the establishment of a new farm which will mainly be devoted to cotton and juar. Additional farm buildings were commenced at Hoshangabad to accommodate the increased staff rendered necessary by the extension in the area, and also at Raipur where, although the actual area of the farm was not altered, the cultivation was increased. Work was also undertaken in sinking wells and laying on pipes to irrigate the newly-acquired land, and in fencing it; over Rs. 9,000 were spent on extra cattle, and a 6-horse power engine was purchased for the farm at Akola where it is intended to use steam power to work cotton gins and agricultural machinery. Altogether the expenditure on experimental stations amounted to Rs. 93,000 out of a total estimate for all requirements amounting to Rs. 1,64,000.

6. The reports on Agricultural stations have been separately printed in a convenient form, and they contain a detailed account of the manurial, rotation and tillage experiments which have been conducted. The work at Nagpur has been continued on the same lines as in previous years, and an interesting series of experiments in the manuring of wheat on black-cotton soil has just been concluded. The experiments in the hybridization of cotton have progressed to the stage of producing seven promising varieties which are now to be tested for yield. The results will be watched with much interest. The stations at Hoshangabad and Raipur have not been working long enough to lead to any definite results, and in the case of Hoshangabad the inauguration of the experiments has not been fortunate, the Superintendent proving himself unfitted for his charge. At Raipur the demonstration of the suitability of such crops as the Surat bean to the conditions of soil and climate met with in Chhattisgarh and the success of tur and juar when sown in rotation may have important results in the future, in inducing the cultivators to introduce greater variety in their cropping, in which rice is at present unduly preponderant.

7. During the last two years measures have been undertaken for the improvement of the quality of the local cotton by the establishment of cotton seed-farms and by distributing selected seed. A separate report on these operations

is being submitted to the Government of India. The scheme for inducing cultivators to sow selected seed on their land appears to have met with some success. The selected seed was in most cases sown according to the directions given, and it may be inferred from the fact that the cultivators kept the produce themselves and asked for no compensation on account of shortage in outturn that they considered the seed superior to the local variety. The distribution of seed selected from the best fields in the best cotton-growing tracts to numerous centres in all the cotton-growing districts is a measure which ought in time to have a marked effect in improving the local varieties; but in order that the experiment may achieve its object to the fullest extent possible it is necessary that the selection should be on strictly scientific lines. A mistake was made, which is now being corrected, of attempting to push the cultivation of the longer stapled but more delicate *bani* at the expense of the *jari* variety which the people prefer owing to its being more profitable and less liable to damage. It is possible that something could be done to improve the staple of *jari* by the plant-to-plant selection of the kind designated *Neglectum malvensis*, which is superior in quality and staple to its three kindred varieties with which it is at present grown side by side. When trained men are available for the purpose the experiment should be tried of collecting seed of this variety and sowing it as a pure crop. The selection of seed by managers of ginning factories has not met with much success. The method of selection, which is by appearance only, is very crude and it is not surprising to find that the outturn from seed so selected should have been found to be little, if at all, superior to that usually obtained. While it is desirable that the introduction of better varieties should not be overlooked, the most important point to attend to is the improvement of the short-stapled varieties now almost universally grown. During recent years the cultivation of this class of cotton has been unusually profitable and the cultivators are not likely to abandon it in favour of any longer stapled variety until the success of the latter has been fully demonstrated, nor would they be wise to do so.

Six hundred pounds of acclimatised Upland Georgian cotton were distributed to District Officers in 1905, and it would have been interesting if the Director of Agriculture could have given fuller information as to the character of the outturn. A large quantity of other seed besides cotton was also distributed, but the results of the sowing are inadequately described in the report.

8. Considerable improvements were made during the period under report in laying out the Maharaj Bagh at Nagpur, to the attractions of which a notable addition has recently been made by the unveiling of a statue of the late Queen-Empress. The stock of plants in the garden has been largely increased under the supervision of the trained gardener who was employed in the previous year, and even allowing for the fact that the present report is for a period of 15 months, the increase in the receipts from Rs. 3,573 to Rs. 7,036 is an indication of more successful management and goes far to counterbalance the increased expenditure on establishment. In District Gardens the results are similar to those in previous years. The season was on the whole unfavourable, and the production of plants, as well as the monthly issues, has declined. The decrease is however to some extent due to the transfer of Sambalpur to Bengal. The receipts have increased somewhat but not to the same extent as the expenditure and they cover only 38 per cent of the cost of the gardens, as compared with 41 per cent in 1904-05. In Mandla, where the financial results were the best, the receipts only amounted to a little over two-thirds of the expenditure. The Chief Commissioner has no desire to judge the District Gardens entirely by financial results; he is aware that in many district the honorary Superintendents devote much time and labour to supervising the work of the staff, and that their management is on the whole successful The gardens are in many places greatly appreciated by the residents and if properly managed they add to the amenities of life in a small station. At the same time it is necessary to guard against the waste of public money, and even allowing for the fact that a part of the produce is distributed gratis and that experiments are undertaken which can yield no pecuniary return, the financial results are not as good as might reasonably be expected. The explanation that the gardeners are incompetent or lazy and that the coolies are underpaid is in itself unsatisfactory, and the Director of Agriculture must endeavour to improve the staff wherever measures in this direction are clearly required; but it appears to the Chief Commissioner from the varying results in the same districts from year to year that the success of the garden is more dependent on the Superintendent for the time being than on the character

of the staff, and it would be well in the first place for the Director of Agriculture to consider, in the case of any garden where the management is manifestly defective, whether a more judicious selection of the Superintendent is not possible.

9. The Chief Commissioner regrets to observe that no arrangements have as yet been made to establish a nursery in Government forest, for rearing the tasar moth, on the lines suggested by Mr. Mukerji in his report, so as to provide a centre for the distribution of good seed cocoons. It has been recognized that the chief reason for the decline in the production of silk fabrics is to be found in the decreased supply of the raw material resulting from the felling of malguzari and zamindari forests and the stricter enforcement of the regulations for the protection of Government forests. If Government could provide and maintain a sufficient stock of cocoons to be used as seed, there would be nothing to stand in the way of a very considerable development in the industry since at present the demand is always in excess of the supply. For this reason it has been decided to establish a nursery which would from time to time be replenished by wild cocoons collected through the agency of the Forest Department so as to avoid the degeneration to which the worm is subject under culture. The scheme is one of great interest, and if successful would have most important results. The selection of a site for the nursery should be a matter of no great difficulty; there are, it is believed, several suitable places in the forests of Chanda which would be within easy access from some of the stations on the Gondia-Chanda Railway, and the Chief Commissioner desires that some practical steps may be taken in this direction without further delay.

10. Though the subject of rearranging and extending the exhibits at the Nagpur Museum has now been engaging attention for some time, it is impossible to say that much real improvement has been effected up to the present. The geological specimens have been catalogued and labelled with the assistance of the Director of the Geological Department, but they cannot be exhibited until the structural alterations now in progress are completed. The Archæological Assistant who was temporarily lent to the Provinces by the Director-General of Archæology has done much to remedy the disorganized state of the archæological exhibits which he found lying about the Museum in confusion. They have been classified and labelled and are now located in the eastern hall of the building. But though some progress has been made, which the large increase in the number of visitors shows that the public have appreciated, the work which has been done up to the present is only a beginning and much more remains for the Committee of management to accomplish before the Museum can be said to have been put on a really satisfactory footing.

11. The report cannot be regarded as a very satisfactory one, but the administration of the Department has, as the Director points out, been conducted under considerable difficulties. It is particularly unfortunate that this should unavoidably have been the case during a period in which schemes of re-organization of great importance to the future progress of the Department had to be worked out. The Chief Commissioner is obliged to the various officers who have held the Directorship on a temporary tenure for the assistance which they have given, and wishes particularly to acknowledge the energy and enthusiasm with which Mr. Low applied himself to the work of the post while he held charge of the Department.

ORDER.—Ordered that a copy of this Resolution, together with the enclosures, be submitted to the Government of India in the Revenue and Agriculture Department, and that copies be forwarded to the Director of Agriculture, and to all Commissioners and Deputy Commissioners, Central Provinces, for information and guidance, and that it be published in the Supplement to the *Central Provinces Gazette.*

W. N. MAW,

Second Secretary to the Chief Commissioner,

Central Provinces.

No. 3285.

FROM

L. E. P. GASKIN, ESQ., I. C. S.,

DIRECTOR OF AGRICULTURE,

Central Provinces,

TO

THE SECRETARY TO THE CHIEF COMMISSIONER,

AGRICULTURE DEPARTMENT,

Central Provinces.

Nagpur, the 10th October 1906.

SIR,

I have the honour to forward herewith the Report on the working of the Agriculture Department for the period 1st April 1905 to 30th June 1906.

2. The report would have been ready in time, or nearly so, but for the fact that most of it was written on tour and some points arose which could not be settled by correspondence and had to be left until my return to Nagpur. Owing to my deputation to Simla to attend the Conference of Registrars, Co-operative Credit Societies, I was unable to return to Nagpur until the 5th October 1906.

I have the honour to be,

Sir,

Your most obedient Servant,

L. E. P. GASKIN,

Director of Agriculture.

Report on the working of the Department of Agriculture, Central Provinces, for the period 1st April 1905 to 30th June 1906.

Expansion of the Department.

1. During the period under report a grant of Rs. 2,20,000 was received from the Government of India; the Department was separated from that of Settlements and Land Records, and a separate post of Director was created.

2. It was decided to enlarge two of the existing stations and to establish an experimental station in Berar to deal chiefly with problems connected with cotton cultivation. 271·45 acres of the best cotton land were acquired near Akola.

3. Out of the grant of Rs. 2,20,000 Rs. 1,75,738-15-5 were actually spent before the 31st March 1906. In the Central Provinces the sanctioned expenditure was Rs. 1,37,585-0-5 out of the grant of Rs. 1,40,000, and in Berar Rs. 65,498-8-0 out of Rs. 80,000. The actual expenditure was Rs. 1,18,072-5-5 and Rs. 57,666-10-0. In the Central Provinces Rs. 87,461 were handed over to the Public Works Department, but they were unable to spend more than Rs. 67,948. In Berar the cost of land was considerably over-estimated, and this was discovered too late for the money to be utilised in any other way.

4. The expenditure may be classified thus:—

	Rs.	a.	p.
Irrigation works on experimental stations ...	10,009	0	0
Buildings, roads and fencing on experimental stations ..	34,992	0	0
Cattle, implements and machinery ...	23,350	8	0
Acquisition of land	43,701	7	5
Office of the Director	27,075	0	0
Purchase of bungalows in Nagpur as residences for officers of the Department	36,611	0	0
Total ...	1,75,738	15	5

The irrigation works consist of laying iron pipes and sinking wells. New buildings are necessary to accommodate the increased staff and the larger number of cattle required to manage and cultivate the areas added to the experimental stations. The additional areas make the purchase of more cattle, implements and machinery necessary The land required for the new station in Berar cost Rs. 32,168-2-0 of the total expenditure on land. As the Department has been separated from that of Settlements and Land Records a new office establishment was necessary. The provision of houses for Government officers in Nagpur is part of a settled policy and so bungalows have been purchased for the use of the experts who are to join the Department.

5. In the scheme for the expansion of the Department put forward by the Local Government, the entertainment of the following staff to be recruited in England was proposed:—

Three Expert Agriculturists.
One Agricultural Chemist.
One Botanist.
One Entomologist.

The Secretary of State, however, has sanctioned the employment of the following only:—

Two Expert Agriculturists.
One Agricultural Chemist.
One Botanist.

Of these one Agriculturist and the Chemist have arrived in the country.

6. The scheme further provides for Native Assistants to the Professors and for an agricultural service which will ultimately consist of 59 Agricultural Assistants (including probationers) on salaries ranging from Rs. 40 to Rs. 250

per mensem. The experimental stations will absorb 23 of these, 27 will work in the districts and will be available for foreign service. As most of these men will have to be trained, it will be some years before these posts are filled up.

By the end of the period under report the staff actually employed was:—

One Expert Agriculturist.
One Agricultural Chemist.
One Assistant Director.

Experimental stations.

Four Managers.
Five Overseers.
Four Probationers.

Demonstration.

Eight Agricultural Assistants.

7. The post of Agricultural Superintendent created in August 1905 was held for a time by Mr. Bhayalal, but in May 1906 it was necessary to appoint him Manager of the new station in Berar and there was no body to put in his place as Agricultural Superintendent. It was also necessary to take away one of the Agricultural Assistants employed on demonstration work, and to appoint him Overseer at the new station.

II.—Agricultural Education.

Agricultural School.

8. There was no change in the work or staff of the Agricultural School during the year. But during the current year it will be raised to the status of a College, with a three-year's course and a curriculum based on the lines suggested by the Board of Agriculture.

9. There were 8 students in the senior class, of whom 1 received a scholarship tenable at the Poona Science College, and he left in January 1906. The rest all passed the final examination. Of these 7, 4 are now employed by the Department. The Head Master reports that a good many students joined the junior class at the beginning of the year, but many left and only 5 remained till the close of the year's course. All these passed the prescribed examination. The Inspector-General of Agriculture, who was one of the Examiners was, by no means satisfied with the progress made by the students. The year's work was, however, considerably interfered with by plague, the School being closed from 7th February 1906 to 31st March 1906.

10. Considerable doubt as to the efficiency and energy of the staff has been expressed by my predecessors. In view of the fact that the School is to be raised to the status of a college this is a matter of the gravest importance; I trust that, with the addition of a European expert as Principal and with the assistance of the experts in the various branches, it will be easy to decide if the present staff can reach the necessary level; if not, they must be replaced. I do not feel competent to pass judgment at present. The most I can say is that I share the doubts expressed by my predecessors.

11. The fall in the number of new students is disappointing. The Head Master says that those who left did so because they thought they would do better elsewhere. The prospects offered by this Department are not as yet understood or appreciated, and until the new scheme is definitely sanctioned the Department cannot be advertised.

The expenditure on these classes was Rs. 2,893.

Normal Classes.

12. 108 schoolmasters were under instruction and 102 passed the prescribed examination. I am in general agreement with the views expressed by my predecessor in last year's report. The re-constitution of these classes is a matter to be decided in consultation with the Educational Department; so many side issues are involved that it has not been possible to deal with the question during the year. The cost of these classes was Rs. 2,461.

13. Seventeen students joined the class, but only 12 appeared at the examination, of whom 11 passed. It is reported that one pupil purchased implements to the value of Rs. 300 and demonstrated their use in his own village, and that others applied for implements which were unfortunately out of stock. Thirteen out of the 17 students held scholarships. I have not been fortunate enough to meet any ex-pupils, so I cannot say how far they apply the knowledge acquired in the class in practice. The cost of the class was Rs. 1,880.

Malguzari class.

14. The number of subscribers to the "Agricultural Gazette" was 2,094 against 1,907 in the previous year. An English edition is now published, the first number appearing in December 1905. I regret to say that this edition does not appear to receive as much attention from District officials as it might. Considerable efforts have been made to bring it to a high level. On the other hand, there is a danger of the vernacular editions becoming too technical and too scientific to be readily understood by the majority of subscribers. The preparation of a magazine, which shall contain matter readily understood and at the same time convey useful and practical information, is a matter of considerable difficulty, and it may be some time before the right mean is found.

15. No bulletins were issued during the year. The report on the Nagpur Experimental Station will serve the purpose of the booklet suggested in last year's report—more especially if supplemented by a map.

III.—Agricultural Enquiry and Experiment.

A.—Experimental Stations.

16. Reports on these stations have been submitted: they consist of "a scientific record of experimental results," in addition a general review of their administration will be found appended to this report: no remarks are, therefore, necessary here.

B.—Agricultural Demonstration and Enquiries.

17. The most important piece of work was the demonstration of the principles of seed selection by means of guaranteed seed farms. This demonstration was confined to cotton and indeed formed part of a scheme for the general improvement of indigenous varieties. The owners bound themselves to cultivate according to the directions given, and, in return, the Department guaranteed them against any loss they might suffer from the outturn being less than that obtained by the ordinary methods. Four such farms were established, each under the direction of an Agricultural Assistant. In one case the directions were not followed and the guarantee was withdrawn, but the other farms were worked successfully, and no compensation was demanded. In three cases the owners kept the seed and in the fourth it was bought by the Department for distribution. Steps will be taken in the current year to ascertain if this selected seed shows any superiority over that usually sown. It is hoped that the adoption of the principles and methods thus taught may result in some improvement in the local varieties of cotton.

Cotton seed farms.

18 The improvement of the indigenous variety has also been attempted in another way by obtaining specially good samples of cotton through the Managers of Ginning Factories, having them carefully ginned and distributing the seed to the cultivators. This plan was started in 1904.

Selected cotton seed.

About 365,810 lbs. of bani and 33,184 lbs. of jari were purchased between November 1904 and March 1905. The seed was sold at market prices with some exceptions. Almost all the seed was disposed of.

This plan has not been entirely successful: many of the cultivators who sowed the seed report that its outturn was in no way superior to that of local seed and some do not hesitate to say that it was inferior. One reason for this

is that most of the seed distributed was 'bani'. Now 'bani' is a longer stapled and finer variety than jari', but it is not so hardy and does not yield so heavy a crop, and it would appear that, in spite of its superiority as cotton, the other variety, jari, is the more profitable crop.

The plan was again followed during the period under report: but as no great success had been achieved in the previous year, the seed supplied by the Department had not acquired any great reputation, and purchasers were not forthcoming. An error of judgment was made in collecting large quantities of 'bani' seed for which there was not likely to be a sufficient demand. Thus 176,505 lbs. of this were purchased, of which only 33,097 lbs. were sold. 87,873 lbs. of 'jari' seed were purchased and 65,430 lbs. sold. It is clear that under present conditions the cultivation of the 'bani' variety is not likely to increase. Rs. 6,419-2-6 were spent on the purchase of seed during the period under report.

The want of success is due mainly to the distribution of large quantities of 'bani' seed, possibly in localities not suited to its cultivation: but in the case of 'jari' results are more promising, and there are, in a few cases, signs that the people understand the value of selected seed and are willing to pay a higher price for it.

Demonstration farms.

19. Two small demonstration farms were working during the period under report—one at Betul and one at Bhatapara (Raipur District): in both cases the object was the same, the demonstration of Nagpur methods of cultivating juar and cotton. I think some impression was made in Betul, but in Raipur local conditions do not favour the rapid adoption of new methods.

Implements.

20. The use of fodder-cutters and winnowers was demonstrated in 17 districts. These machines have acquired a certain popularity and more would be purchased but that people are afraid that they may get out of order and that they will not be able to repair them.

Sewage disposal on the Meagher system.

21. The Meagher system of manuring with sewage was shown in five districts, but generally speaking the people will not cultivate land thus treated.

Use of sulphate of copper.

22. Pickling of juar seed in sulphate of copper to prevent smut was demonstrated in eight districts. In some districts the advantages of this are fully recognised; in Nimar this year the people themselves purchased sulphate of copper to carry on the practice.

Sugar-cane experiments.

23. A party consisting of Mr. Bhayalal and two expert gur-makers from Poona toured in Chanda to demonstrate the superiority of the Poona sugar-cane mill, pan and furnace. This party did useful work and the people appeared to recognise the advantages of the methods demonstrated. The Assistant to the Imperial Agricultural Chemist accompanied by the Assistant Director and Mr. Bhayalal paid another visit to Lanji in Balaghat, where a very superior kind of cane had been discovered in the previous year. Unfortunately owing to a misunderstanding the Assistant was only able to pay a short visit, and during his stay conditions were very unfavourable owing to rain; the results of the analysis do not appear to be as good as last year.

A detailed inquiry into the varieties of cane grown and the methods of cultivation practised in these Provinces is contemplated.

The embankment of wheat lands.

24. During the period under report the Irrigation Department had in hand 50 field embankments in the Saugor, Damoh and Seoni Districts; of these 38 had been started in the previous year. The expenditure on these works was Rs. 71,205 and the works are estimated to irrigate (or protect) 7,638 acres. The outturn of wheat on fields previously embanked was disappointing. I have obtained figures for 21 cases in the Saugor

District and the average is 454 lbs. per acre. The rainfall was very deficient, and the Superintending Engineer considers that the low outturn is due to the people waiting for more rain and missing the proper time for sowing. But in any case the outturn of these fields should have equalled, if not exceeded, that in unembanked land; the average outturn for the district is given as 100 in American Notation, which would represent, according to the present standard, a yield of 600 lbs. per acre. The real reason for the poor results would appear to be that the construction of the embankments has, by exposing the subsoil, rendered the fields temporarily unfit for wheat, and, when this newly exposed subsoil has weathered, much better results may be confidently awaited. Linseed would have done better under these conditions.

25. No accurate statistics of the amounts spent on embankments by private persons are available, but in Saugor Rs. 32,275 were advanced under the Land Improvement Act, and the Deputy Commissioner considers that the greater part of this was probably spent on embankments.

Distribution of seed.

26. A table showing the amounts of seed distributed is appended. The amounts shown as distributed to District Officers are in almost all cases re-distributed by them to members of the District Agricultural Associations and other persons who may wish to try them.

27. The quantities of 'jari' and 'bani' cotton shown as distributed are included in the quantities mentioned in connection with the scheme for the improvement of indigenous varieties.

28. Of the total amount of 1,834 lbs. acclimatised Upland Georgian cotton seed, 600 lbs., were issued to District Officers in 1905 for distribution and 1,075 lbs. in 1906. The latter was of course sown only during this monsoon and no results are therefore at present available. I regret that the reports received on the results of the seed sown in 1905 are rather vague. This seed was distributed as follows :—

	lbs.
Nagpur	100
Wardha	200
Yeotmal	100
Akola	100
Buldana	100

No one has furnished definite results. The general impression appears to be that the outturn per acre is less than that of 'jari,' and it is extremely doubtful if the produce will command an increase in price per pound sufficient to compensate for the smaller outturn per acre.

In some cases, too, the produce has not fetched a higher price, the quantity available in one place not being large enough. Small parcels of even superior cotton will not command an enhanced price: there must be a considerable quantity available at one centre.

The results in Nagpur and Wardha, however, are an exception to the above remarks. As before, no definite results have been given, but those who sowed the seed have expressed themselves satisfied with the results and are sowing it on a larger scale this year.

29. Saoner juar has attained some degree of popularity, and Nagpur tur, which is an early ripening variety and has a chance of escaping frost, is fully appreciated in the Nerbudda Valley.

There was no rust during the period under report and so the hybrid wheat was not tested.

Agricultural Associations.

30. A regular roster of meetings in September-February and April-May has been arranged, so that an officer of the Department can attend each meeting. Nearly every Association met on the dates fixed and a few held meetings independently. Associations were formed in the Berar districts.

These Associations need much advice and assistance from District Officers. Where these are forthcoming there is some hope of good and useful work. Where they are not, there seems to be little initiative or energy on the part of the members themselves. As time goes on and the staff of the Agriculture Department increases in size and knowledge it will no doubt make its influence more widely felt.

The constitution of some Associations is perhaps defective; such consist mostly of members resident at head-quarters, large and influential landlords no doubt, but men who take no practical part in cultivation. What is wanted is the addition as members of men who supervise the cultivation of their land, who have a practical knowledge of present methods and sufficient intelligence to appreciate improvements. Steps have been taken to add men of this type to associations in which they were few or absent.

Co-operation with the Imperial Agricultural Chemist.

31. The only work done has been described in paragraph 23 above.

Co-operation with the Reporter on Economic Products.

At the request of the Reporter on Economic Products to the Government of India the following collections were made:—

(*a*) A collection of botanical specimens of different varieties of yams occurring in the districts of Berar was made and sent to him for examination. Several of the specimens have been identified and recorded in the Collection of the Economic Museum at Calcutta.

(*b*) Botanical specimens of the gum known in vernacular as "Kat Khair" were obtained from the Balaghat District and sent to the Reporter. They have been identified as *Acacia ferruginea* and registered as such in the Calcutta Herbarium Collection.

(*c*) Enquiries were made as to the source of the native pens obtainable in the Provinces, and specimens and information regarding them forwarded to the Reporter. His report has not been received.

Sale of implements.

32. A table showing the number of implements sold is appended. Fodder-cutters, winnowers and ploughs are the implements which find the most ready sale. The rise in the price of labour in parts of the Provinces will no doubt increase the demand for machinery. People, however, find a difficulty in working and adjusting these machines, and they are sometimes thrown aside as useless when the most trifling adjustment (perhaps a few turns with a screw-driver) would put them in perfect working order. A pamphlet giving detailed descriptions of the machines with illustrations is under preparation and may possibly be of service to purchasers.

IV.—MUSEUMS.

33. Steps were taken to put the Nagpur Museum on a really satisfactory footing. A liberal grant was made from Provincial revenues to meet the cost of improvements. The Director-General of Geology was good enough to depute one of his assistants to arrange and catalogue the geological specimens. The services of an Archæological Assistant were obtained and he has been at work arranging and describing the archæological exhibits. He has also visited places of interest in the province and it is possible that more specimens of archæological interest selected by him may, if there is no local feeling against their removal, be added to the museum collection. Sanction has been given to the appointment of a Taxidermist, and the post will be filled up as soon as a suitable man can be found. The economic and agricultural exhibits have been transferred to the Victoria Technical Institute and useless and decayed exhibits have been removed.

At Mr Holland's suggestion "types" of fossils, &c., belonging to the Hislop collection were transferred to the Calcutta Museum, but the collection does not appear to have contained Hislop's original types. A few specimens, however, which may represent hitherto unknown or undescribed species have been retained at the Calcutta Museum for further examination.

A Committee of Management has been appointed, and a scheme for the future maintenance and care of the Museum is under consideration. The number of visitors rose from 66,715 to 137,940, a satisfactory evidence of the interest the Museum excites, for, although the period under report is 15 months, the Museum was closed for three (April, May, June, 1905) and so the figures represent the attendance for a year only.

The expenditure excluding establishment amounted to Rs. 2,575-10-2, leaving a balance Rs. 7,247-8-0 to the credit of the fund. Some structural alterations are to be made, but as they were not completed the amount allotted for them has not been spent.

The number of visitors to the Raipur Museum was 116,993 against 88,249 in the previous year.

The opening balance of the Museum Fund was Rs. 1,647, the receipts Rs. 713 and expenditure Rs. 607, leaving a balance of Rs. 1,753.

A small establishment is maintained to demonstrate the working of the fly-shuttle loom and of one obtained from Serampur. I understand that some of the local weavers take an interest in these operations. The Museum was visited by the Archæological Assistant and he will describe and arrange the archæological specimens.

V.—General.

Tussar silk cultivation.

I regret to say no progress has been made in carrying out the suggestions made by Mr. Mukerji, Assistant Director of Agriculture of Bengal, in his report on tussar silk cultivation in these Provinces. With the transfer of Sambalpur we have perhaps lost the most suitable tracts for experiment. My own knowledge of the subject is *nil* and I have been much hampered in my endeavours to obtain information by transfers of District and Forest Officers who, with a knowledge of the places where cultivation is now carried on, might have given me valuable assistance. It seems to me that any scheme should be at least initiated by an expert. As far as I can gather, I understand the supply of wild cocoons by the agency of the Forest Department or otherwise is the main difficulty, and it seems almost impossible to guarantee a constant and pure supply.

An Agricultural Assistant has been employed in demonstrating the Japanese reeling machine in the Bilaspur District, but he has met with considerable opposition from the local Koshtas and the machine has not yet gained any measure of popular favour.

Fly-shuttle loom.

35. The use of the fly-shuttle loom is still being taught at the Jubbulpore Reformatory. A party was sent to Chhindwara to demonstrate the use of the machine. The Deputy Commissioner reports that this experiment met with some degree of success, the demonstration excited interest, and inquiries are being made by local weavers about the price of the loom. The Superintendent, Reformatory School, reports that nine machines were sold during the last year.

36. Messrs. Clouston, Deputy Director, and Plymen, Agricultural Chemist, both display the greatest zeal and interest in their work, and when they have acquired some knowledge of local conditions, I have no doubt that they will render valuable service. Thanks are due to Rai Bahadur Joshi, Assistant Director, for his work during the period under report.

37. The working of the Department has been hampered by many difficulties during the period under report. It has suffered severely from want of continuity of administration, no less than three Directors having held office within six months, Mr. Standen up to 25th July 1905, Mr. Low up to 23rd November 1905, and myself for the rest of the period.

The natural, and I think inevitable, confusion consequent on the separation of the office from that of Settlements and Land Records was aggravated by the mass of work which fell immediately on the shoulders of the new establishment, before they had had time to settle down. The preparation of reports, of budgets, the working out of schemes for the immediate expenditure of the grant of Rs. 2,20,000, and for the ultimate expansion of the Department, all had to be undertaken within three months of the separation. The Commissioner of Settlements and Agriculture had at his disposal the services of the Land Record staff; under the new regime the Director cannot command the services of these men to the same extent, if at all. And, considering the strength of the staff of the Agriculture Department proper, some of the schemes in hand seem to me decidedly ambitious. Under these circumstances I trust that any errors or omissions of which the Department has been guilty will be viewed with a lenient eye.

38. I have omitted the sections on Horticulture, Veterinary Department, Meteorological Department and crop cutting experiments; the last two are dealt with by the Department of Settlements and Land Records; veterinary matters have been fully discussed in my review of the report on that Department and any remarks I may have to make on horticulture will find a place in the report on the working of Provincial and District Gardens.

I have the honour to be,

Sir,

Your most obedient Servant,

L. E. P. GASKIN,

Director of Agriculture.

Statement showing Implements sold during the year 1905-06.

Name of implements.	Number of implements supplied to—		
	District and other Government Officers.	Private persons.	Demonstration and Experimental Farms.
Swedish plough	1	12	...
Turn-wrest plough	1	11	1
Hand-thresher	...	3	...
Winnower	7	18	...
Smalley fodder-cutter	2	27	1
Junior feed-cutter	...	10	...
Lever-cutter	...	6	...
Horse hoe	...	1	...
Bullock gear	..	7	...
Broadcast-sower	1	10	...
Corn-sheller	2	7	...
Perfection-sprayer	1	7	...
Bucket pump	..	5	...
Harvester and binder	...	.	1
Grinding machine	...	...	1
Sugarcane mill	...	1	...
Tool-grinder	...	1	..
Tattoo-marker	...	...	1
Hand-sieves	...	6	...
Tifan (country drill)	...	1	...
Sickles	...	23	...
Total	15	156	5

Statement showing the quantity of seeds supplied to the District Officers, Private persons and Demonstration Farms during the year 1905-06.

Names of seeds.	Quantity supplied to—		
	District and other Government officers.	Private persons.	Demonstration and Experimental Farms.
	lbs.	lbs.	lbs.
Cotton (Jari acclimatized)	1,640	3,055	740
Do. (Saoner Jari)	6,618	17,118	1,931
Do. (Bani)	88	18	13
Do. (Upland Georgian acclimatized)	1,675	117	42
Do. (Nimari]	...	...	1
Juar (Early)	1,500	309	...
Do. (Ganeri)	3,820	1,101	250
Do. (Saoner)	4,722	1,653	575
Do. (Motitura)	640	14	30
Do. (Dharwar)	85	...	...
Do. (Ringni)	10	...	...
Paddy Early)	210	210	40
Do. (Chinoor)	545	73	137
Sorghum	185	112	114
Tur	5.5-2	164	800
Bajra (Awned)	115	21	11
Maize	460	32	11
Ground-nut	388	257	29
Ambari	25	4	20
San	35	293	510
Bilaspur Tur	40	3	...
Chawali Sambalpur)	4	1	...
Surat beans	5	..	...
Lima beans	3	2	...
Tiocyn h	...	...	6
Rale (Red and White)	25	2	...
What (Haura, Nagpur)	...	850	...
Do (Hybrid)	2,400	506	...
Gram		402	...
Til (Winter)	290	24	20
Peas (Ordinary)	300	46	...
Do. (Khaparkhera)	61	13	...
Castor	.	40	..
Total	31,471	26,440	5,280

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APPENDIX.

Report on the working of the Experimental Stations, Central Provinces and Berar, for the period 1st April 1905 to 30th June 1906.

1. At the beginning of the period under report there were three Experimental Stations in the Central Provinces, Nagpur, Hoshangabad and Raipur. The Nagpur station was established in 1883 and was, until May 1903, the only station in the province; it is a general Experimental Station and work is not confined to any particular problems or crops.

The Hoshangabad station is situated in the main wheat tract and the Raipur station in the main rice tract of the province, and the main work at these stations will be in connection with these crops, *i. e.*, with wheat at Hoshangabad and rice at Raipur.

2. During the period under report a grant of Rs. 2,20,000 was received from Imperial revenues for the expansion of the Agricultural Department, and as one step in this direction it was decided to increase the areas of the stations at Nagpur and Hoshangabad and to establish a new station in Berar. 189·09 acres were acquired at Nagpur and the area increased from 90 acres to 279·09; at Hoshangabad the area was increased by 176·95 acres and is now 491·10 acres. 271·9 acres were acquired in the Akola District four miles from Akola town and this will form the Akola station at which work will be chiefly confined to problems connected with cotton cultivation, the improvement of the staple and the like.

3. These extensions and additions call for increased accommodations both for man and beast; even at Raipur, though the area remains the same, more land has been brought under cultivation, and new buildings have been found necessary. Buildings are under construction at Raipur and Hoshangabad and will shortly be started at Nagpur and Akola. At Akola it is intended to use steam power to work cotton gins and agricultural machinery. A 6-horse power engine has been purchased and it will be set up as soon as the engine and worksheds are ready.

4. The expenditure involved in these additions is:—

	Nagpur.	Hoshanga-bad.	Raipur.	Akola.	Total.
Cost of land	4,051	7,481	...	32,168	43,700
Buildings and wells	16,371	24,378	11,246	52,515	104,510
Fencing	3,912	1,314	2,456	2,739	10,421
Machinery	...	366	...	5,084	5,450
Total ...	24,334	33,539	13,702	93,506	164,081

Of this amount Rs. 83,890 were spent up to the 31st March 1906 and in addition Rs. 9,272-2-3 were spent on the cattle necessary for the cultivation of the new areas.

5. Under the scheme submitted for the expansion of the Department, the staff employed at these stations will ultimately be:—

	Farm Managers.	Overseers.	Probationers.
Nagpur	1	4	2
Hoshangabad	1	3	2
Raipur	1	2	2
Akola	1	2	2

But at the close of the period under report the actual staff employed was:—

	Farm Superintendent.	Overseer.	Probationary Overseer.	Sub-Overseer.
Nagpur	1	1	4	...
Hoshangabad	1	1	2	...
Raipur	1	1	2	...
Akola	1	1	2	...

I am most reluctant to add any but fully trained and competent hands to the staff, and I have therefore only enlisted the minimum numbers required for the management of these stations. I hope that with experience and the further training they will receive on the stations the new men will do well, if not they must be replaced.

Nagpur station.

6. Perhaps the most important series of experiments at this station was that dealing with manures for wheat. The series was duplicated, series A being irrigated and series B unirrigated. The series have been carried on since 1890 in the case of series A and since 1885 in the case of B. The results have been discussed at length in the report on the station; speaking generally they may be said to show that cattle-dung not only gives the best outturns but is the most economical manure to apply. The manures used were saltpetre, bone-dust, cattle-dung, ashes of cattle-dung and green soiling with san hemp. These series have now been abandoned and the plots will be cropped continuously with some exhausting crop to test their acquired fertility.

7. There are several rotation series both in kharif and rabi crops which call for no special notice here. In the tillage series the plot cultivated with the Swedish plough has given better results than those cultivated with country implements.

8. Seventy-five varieties of cotton and 39 crosses were grown. With the exception of Up-land georgian which has been acclimatized on the station, the exotics were a failure. Egyptian cotton appears to take 8 months to mature and it appears impossible to grow these varieties without irrigation. Nearly all the Indian varieties did well, but most of them are in no way superior to those already grown in the province; and only four have been selected for further experiments on a larger scale. Seven of the 39 crosses have been selected for further experiment; "bani", the long stapled local variety, is one of the parents in five cases. These varieties will now be tested for yield.

Caravonica is a failure so far; the plants have failed to produce bolls and have only grown to a height of four feet; they suffer greatly from insect pests in spite of the copious use of insecticides.

9. During the period under report a new Experimental Series has been started to test the value of chemical fertilizers for cotton.

The fertilizers used are nitrate of soda, sulphate of potash and superphosphate; they have been applied singly and in combination. Forty-four kinds of tur have been sown in the hope of finding a variety more or less resistant to wilt. Experiments in the value of cattle-dung manure prepared in different ways have also been started. Some jute has been sown but it does not seem to promise very well.

Telankheri station.

10. This station, situated about two miles from the Nagpur station, is subsidiary to it and is used for raising seed for distribution. A statement showing the crops raised, &c., is appended.

At the Nagpur station the area is thus allotted:—

Experimental cultivation ...	12·47	acres.
Crops raised for seed distribution	51·06	„
For other purposes—student's plot	6·00	„
Fallow ...	*Nil.*	„
Grazing ...	20.00	„

11. As previously stated experiments at this station are chiefly confined to matters affecting wheat. The station was only established in 1903, and no definite results have been obtained; in fact I am sorry to say that many of the results which have been obtained are worthless owing to mistaken treatment of some of the experimental plots.

Hoshangabad station.

The ground on which these are situated slopes from south to north and considerable erosion goes on; to remedy this an attempt was made to level the plots, and earth from the higher portion was dredged down to the lower thus exposing the subsoil and altering the character of the soil from year to year.

12. The most important experimental series are those dealing with the effect of various manures—A on irrigated and B on unirrigated wheat. No reliable results have been obtained.

Other series are rotation, tillage, irrigation and eradication of kans; no definite results worthy of notice have been obtained.

Experiments trying to induce rust in wheat in order to see which variety was most resistant were undertaken, but were not properly carried out.

13. I regret to say that the management of this station has been far from satisfactory in the past. I have mentioned the great error made in dealing with the experimental plots, and I have reason to believe that other operations were not carried out with that scientific accuracy which is absolutely necessary for reliable results. The Superintendent was not a suitable man; he has been transferred and I trust that under the new Superintendent, assisted by the expert advice and supervision which is now available, the station will soon be all that it should be.

14. The area is thus allotted—

Experimental cultivation	...	35·70 acres.
Crops raised for seed distribution.		247·67 „
Fallow	...	0·60 „
Grazing	...	152·60 „
For other purposes	...	50·00 „

15. A cattle-breeding farm is attached to this station. Details will be found in the report on the Veterinary Department. Young bulls are now available and will be lent to suitable persons who may come forward. Inquiries to this end are being made.

16. At this station the main crop for experiment is rice. The scheme of experiments in this crop include experiments in the various methods of sowing and cultivation, in manures, in tillage, in rotation and in irrigation. This station was only opened in 1903; much of the land was waste and the results of experiments are due more to initial variations in the character of the soil than to the treatment the plots received. As far as they go, the results show the superiority of transplantation over other methods of dealing with rice, and of sewage applied according to the meagher system over any other kind of manure. The generative irrigation experiments were not carried out as the appliances for conveying and measuring the water were not constructed in time. There is a manurial series for wheat, but no reliable results have yet been obtained. Experiments in the cultivation of cotton, juar and jute were undertaken; cotton was grown in rotation with juar. On the unmanured and unirrigated land an average outturn of 252 lb. of seed-cotton was obtained. The plants were strong and healthy to look at, but bore a very limited number of bolls. Matasi soil is not well suited for this crop; in the year under report it suffered somewhat from water-logging. Juar did fairly well; jute was an absolute failure; the experiment is being repeated under the guidance of an experienced jute cultivator from Dacca.

Raipur station.

17. The management of this farm has been excellent and the lack of definite results is due to initial variations in the fertility of the soil and not to any mismanagement.

18. This station was opened in May 1906. A large part of the area has been sown with juar. The land necessary for experimental plots will be cut up into small plots and the produce harvested and weighed separately; it should then be possible to get a series of plots with little or no variation in initial fertility.

Akola station.

19. The general conclusion is that with the exception of Nagpur it will be some time before the stations produce results worthy of serious consideration. My attention has been forcibly drawn to the absolute necessity of expert and scientific supervision, and also of a highly trained staff to work on the stations. There are many details which have come to my notice which show that the staff employed have not always realized the necessity of scientific accuracy in matters of detail, without which no reliable results can be obtained.

20. I should like to see experiments carried to a practical conclusion. It is not enough to find out that a certain manure gives the largest increase in yield ; it should also be ascertained whether, after adding the cost of manure to the expenses of cultivation, the net profit is increased or not. Experiments are also necessary to find out how often it is necessary to apply manure in order to secure the maximum outturn at the minimum cost. Mr. Clouston Deputy Director, in his articles in the August and September numbers of the Agricultural Gazette, shows that the application of some manures resulted in a loss ; and it is open to question whether the application of manures once in two, three, or even four years, while not giving a larger gross outturn, would give the cultivator a larger profit.

21. The great indictment against the department is that it is not practical enough ; cultivators are ready enough to admit the superiority of its methods (or some of them) and the excellence of its crops, but their one answer to advice to follow these methods is " but see what you spend" ; they evidently do not believe that the increased value of the outturn compensates for the increase in cost of cultivation. Scientific inquiry must come first, but it should be succeeded by a thorough test of the practical value of the results gained as applied to everyday life. Until such practical value is amply demonstrated, the results obtained by the department will carry very little weight. The department too, I think, needs more advertisement. It should take the public into its confidence and publish its results more widely ; there is, however, some danger that inconclusive results might be accepted as final, and considerable care would have to be exercised in deciding what to publish and what not.

22. Statements showing the receipts and expenditure are appended.

23. Mr. Tundilal Powar, Manager, Raipur station, has done best, but Messrs. Bhayalal and Nandkishore, who were in charge of the Nagpur station, have also done good work.

L. E. P. GASKIN,

Director of Agriculture.

Statement showing the areas and outturn of crops grown in the Telinkheri Station for the period from 1st April 1905 to 30th June 1906.

Name of crop.	Area in acres.	Outturn per acre.	Remarks.
	Acres.	lb.	
Cotton (Jari)	15·02	195	
Juar	11·25	516	
Do. (Dharwar)	1·30	100	
Tur	4·95	583	
Paddy (early)	10·45	22	
Do. (Chinoor)	·90	532	
Do. (Gurmetia)	1·50	43	
Til (rainy)	4·10	39	
Do. (winter)	2·60	82	
Wheat	9·95	585	
Do. (Jondhala)	·40	105	
Linseed	5·60	228	
Gram	5·20	201	
Castor	3·05	4	
Safflower	2·05	594	
Jute	·20	155	
Coriander	·50	24	
Total ...	79·02	...	

Statement showing the Receipts and Expenditure of the Experimental Station, Nagpur, for the period from 1st April 1905 to 30th June 1906.

Head.	Amount.	Remarks.
Receipts.	Rs. a. p.	
Commercial sale of produce	2,663 8 11	
Distribution ... { Seeds	885 4 8	
Distribution ... { Implements	305 13 9	
Rent of Government land	972 0 0	
Sewage farm	1,840 15 6	
Miscellaneous	553 8 0	
Total Receipts ...	7,221 2 10	
Charges.		
Establishment	6,085 6 3	
Travelling allowance	300 12 0	
Supplies and Services.		
Charges for seed grain	47 7 3	
Farm buildings	1,272 3 7	
Purchase of cattle and implements	549 8 8	
Feed and care of cattle	458 6 9	
Variable labour	356 3 3	
Sewage farm	866 5 9	
Other charges	1,022 13 8	
Contingencies.		
Postage charges	61 1 10	
Telegram charges	3 12 0	
Country stationery	1 12 9	
Total Expenditure ...	11,025 13 3	

Statement showing the Receipts and Expenditure of the Experimental Station, Hoshangabad, for the period from 1st April 1905 to 30th June 1906.

Heads.				Amount.
	EXPERIMENTAL FARM.			
	Receipts.			Rs a. p.
Commercial sale of produce	...	...	...	1,375 0 9
Distribution of seeds	...	...	...	442 2 2
Do. implements	...	...	...	3 11 9
Rent of Government land	...	...	...	...
Sewage farm	...	...	...	...
Miscellaneous	...	...	...	10 9 0
		Total Receipts	...	1,831 7 8
	Charges.			
Establishment	...	...	...	3,028 9 1
Travelling allowance	...	...	...	117 13 0
Charges for seed-grain	...	...	...	134 1 9
Farm buildings	...	...	...	205 6 9
Purchase of cattle and implements	...	...	...	816 7 4
Feed and care of cattle	...	...	...	407 14 3
Variable labour	...	...	...	434 10 0
Sewage farm	...	...	...	...
Other charges	...	...	...	1,040 13 7
Postage charges	...	...	...	45 0 6
Telegram charges	...	...	...	2 5 0
Country stationery	...	...	...	0 5 0
Miscellaneous	...	...	...	0 4 0
		Total Charges	...	6,233 10 3
	CATTLE-BREEDING FARM.			
	Receipts.			
Sale of animals	...	...	...	123 4 0
Sale of produce	...	...	...	...
Other heads	...	...	...	...
		Total Receipts	...	123 4 0
	Charges.			
Establishment	...	...	...	167 13 4
Feed and care of cattle	...	...	...	910 7 11
Cultivation expenses	...	...	...	...
Purchase of animals	...	...	...	...
Other heads	...	...	...	1,516 1 9
		Total Charges	...	2,594 7 0

Statement showing the Receipts and Expenditure of Raipur Station for the period from 1st April 1905 to 30th June 1906.

Heads.	1904-05.			1905-06.			Remarks.
Receipts.	Rs.	a.	p.	Rs.	a.	p.	
Sale-proceeds of grain	313	2	8	1,101	13	4	
Do. grass	31	0	0	228	4	0	
Other receipts	454	3	6	63	10	8	
Total ...	798	6	2	1,393	12	0	
Charges.							
Establishments' pay	2,262	4	7	3,502	8	11	
Travelling allowance	152	11	0	58	4	6	
Total ...	2,414	15	7	3,560	13	5	
Supplies and Services.							
Charges for seed-grain	159	9	9	81	10	3	
Farm buildings	687	6	0	174	8	0	
Purchase of cattle and implements ...	16	5	0	666	15	6	
Feed and care of cattle	129	8	3	466	5	9	
Variable labour	170	13	6	200	12	6	
Other charges	473	3	9	1,029	12	6	
Total ...	1,636	14	3	2,620	0	6	
Contingencies.							
Postage charges	10	6	0	31	1	0	
Telegram charges	2	4	0	7	0	0	
Country stationery	0	7	9	0	6	3	
	13	1	9	38	7	3	
Total Charges ...	4,064	15	7	6,219	5	2	

REPORT

ON THE WORKING OF THE

DEPARTMENT OF AGRICULTURE

OF THE

CENTRAL PROVINCES

DURING THE YEAR ENDING

30TH JUNE 1907

Agents for the sale of Books published by the Central Provinces Administration.

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A. M & J. FERGUSON, Booksellers, Ceylon.

Agriculture Department.

No. 828 / XIII-18—3.

Nagpur, dated 23rd December 1907.

READ—

Report on the Department of Agriculture, Central Provinces, for the year ending the 30th June 1907.

READ ALSO—

Report on the Agricultural Stations for the same period and letter No. 2740—I-7, dated the 10th September 1907, from the Director of Agriculture, forwarding the same.

Report on the management of the Provincial and District Gardens in the Central Provinces for the same period and letter No. 2615, dated the 29th August 1907, from the Director of Agriculture, forwarding the same.

RESOLUTION.

Staff.

During the year under review the superior staff was strengthened by the appointment of a European Principal for the Agricultural College, and the recent arrival of an Agriculturist with general training, who will set free the present Principal of the Agricultural College, will enable arrangements to be made for the proper supervision of the work of the Department in the northern half of the Provinces, which is at present divided between the Director and his Deputy. A scheme has also been sanctioned for the re-organization of the cadre of Agricultural Assistants for employment on the Farms and on demonstration work. In fixing the scale, which will now stand at 10 first class assistants, 32 second class, and four probationers, allowance has been made for such development of the Department as may be normally expected during the next few years, and the recruitment of the staff up to its full sanctioned strength must depend on the progress of that development and the supply of candidates available. The general rise in the cost of labour, both skilled and unskilled, which has marked the past few years has necessitated a complete re-organization of the inferior establishments on the various Experimental stations.

Education.

2. The progress of Agricultural education during the past few years has not been very encouraging. The poorness of the prospects offered to passed students of the Agricultural School, the inadequacy of its equipment as regards both staff and apparatus, and an imperfect appreciation among the classes whose welfare depends solely upon agriculture of the advantages and possibilities of scientific agricultural training, have all combined to throw obstacles in the path of progress. Owing to the improved prospects of advancement now offered by the Agricultural Department, and the raising to Rs. 30 of the minimum wage offered to passed students by the Settlement Department, the first of these causes has now to a large extent ceased to be operative. With the raising of the school to the status of a College giving a three years' course and teaching up to the Pusa standard, the improvement of its equipment, the appointment of a European Principal, and the abolition of the anomalous system of dual control by the Director of Public Instruction and the Director of Agriculture, the teaching facilities can no longer be considered inadequate for their purpose. The third obstacle is one that can

only be overcome if the influence of District Officers and the Agricultural Associations is employed to arouse and foster a sense of the advantages offered by a course of training in the principles of scientific agriculture, and the Chief Commissioner trusts that all District Officers, especially in the northern districts, where apathy is said to be most pronounced, will do their best to second the efforts of the Department in this respect. Encouraging signs of the awakening of interest are to be seen in the progress of the Agricultural Associations and the largely increased circulation of the Agricultural Gazette. The usefulness of the latter publication both for popularizing the work of the Department and as an advertizing agency is of special interest.

Experimental stations.

3. Much useful work was done on the Experimental farms during the year. No additional land was acquired, but the new farm at Akola, and the areas acquired during the preceding year for the extension of the Nagpur and Raipur farms, were all brought under cultivation. At Nagpur the most important experiments carried out were those in connection with the rust-resisting capacities of wheat, which tended to show that the variety known as *bansi* is the most promising wheat for rust resistance and cropping power. The straw is, however, reputed to be brittle and to break under hailstones, and there appear to be several distinct strains of *bansi*, of varying qualities. Experiments for testing the residual value of manures tended to show that the residues of bulky organic manures are larger in unirrigated than in irrigated land ; while an important series of experiments, the further progress of which will be watched with interest, suggested that nitrogenous fertilizers will be found to be the most valuable for cotton on the Nagpur soils. The uneven quality of the soil at Hoshangabad, and the scouring from which the plots suffer during the rains, greatly handicapped the experimental work at that station, but the preparation of the new land for cultivation demonstrated the usefulness of the Turnwrest plough for the eradication of *kans* grass. Good work continued to be done on the Raipur Farm in demonstrating the advantages of transplantation under irrigation. As the Director justly remarks, it is of the highest importance "to induce the cultivators to meet the great efforts that Government is making to spread irrigation in Chhattisgarh by a corresponding advance in their style of cultivation." A fair measure of success attended the various experiments made to discover suitable additions to the commercial crops of this Division, the most interesting being those connected with jute, the cultivation of which under the supervision of an expert from Dacca was attended with encouraging results. A point which might be noticed with advantage in future reports is a comparison of the yield obtained on the farms from unirrigated plots with the ordinary yields of similar crops in the neighbourhood, as giving some indication of the extent to which the resources open to any reasonably intelligent cultivator can be made to secure more profitable outturns by skilful and efficient methods of cultivation.

Improvement of cotton.

4. Although no very tangible results have yet been reached in the endeavours made to improve the cultivation of cotton, it is possible now to determine more or less definitely the lines on which those endeavours should proceed for the future. The measures so far attempted have been the purchase and distribution of seed selected by managers of Ginning Factories, the purchase and distribution of selected *jari* seed from the owners of fields where the produce is exceptionally good, and the establishment of cotton seed-farms. The first two of these measures have not been sufficiently successful to warrant their continuance. The selection of seed by managers of ginning factories is conducted in too crude a method to secure a supply of seed appreciably superior to that ordinarily sown; and the *jari* seed specially selected failed to prove its superiority when sown in other tracts. On the other hand, the establishment of seed-farms, supplied with seed obtained by plant to plant selection, and supervised by Agricultural Assistants, has met with a very encouraging measure of success, and the work of these farms is now on a sound basis. The difficulty of making selection really effective, owing to the lack of sufficiently trained Assistants, has yet to be overcome, but this should be merely a question of time. Experimental work was carried on at Nagpur and Akola in connection with manures, the trial of exotic varieties, hybridization, and the selection of seed from promising indigenous and exotic varieties. The manurial

experiments have already been noticed. Of the exotic varieties, the only successful one was *bari*, an American variety acclimatized in Bengal, which is reported to have given a large outturn of very good cotton. The results of hybridization appear to have been indefinite, and the best type has not yet been secured.

Distribution of seed and machinery.

5. The progress made in the operations of the Department for the distribution of seed and machinery bears creditable testimony to its energy. Orders for machinery were received from various parts of India outside the Central Provinces, and the department was unable to cope fully with the demand. Besides the cotton sold from the seed-farms at Saoner and Risod, every kind of seed supplied by the Department showed an increased demand, a result attributable to a great extent to the enlarged circulation of the Gazette. It is to be regretted that still further delay has occurred in the establishment of a *tassar* silk nursery. Several months elapsed before a suitable site could be selected, and it was then found necessary to send the Sericulturist to Chaibassa in Bengal for a course of training, which has not yet been completed.

Agricultural Associations.

6. Much good work is reported to have been done by the District Associations during the year, and the only complaint which the Director has to make about them is that they are apt to suffer from an excess of zeal. There is always a danger that experiments which have no reasonable chance of success, and the inception of which does more credit to the will than to the intelligence of the experimenter, may result in discouragement, and even bring discredit on the operations of the Department, and it is therefore advisable, as the Director remarks, that an expert should be present at all the meetings of the Associations. The Chief Commissioner also trusts that District Officers, while continuing to give the Associations the same help and encouragement as in the past, will exercise somewhat more care in the selection of their members, so as to make them more truly representative of the *bonâ fide* agricultural classes.

Gardens.

7. The working of Provincial and District gardens during the year was satisfactory. Owing to unseasonable weather when the trees were in bloom, the mango crop, on which many of the gardens depend, was a failure, but in spite of this, and of the fact that the report for 1905-06 covered a period of 15 months, the receipts of the Maharajbagh only declined from Rs. 7,036 to Rs. 5,758, and those at District gardens from Rs. 7,067 to Rs. 6,261. The expenditure on the former garden rose from Rs. 19,024 to Rs. 19,377, owing to the laying out of fresh lawns, improvement in the water-supply, and repairs to the menagerie; while that on District gardens fell from Rs. 18,371 to Rs. 13,983. The experiment of appointing Superintendents of offices to the charge of District gardens has been attended with success, and is worthy of further extension. It has now been definitely decided that these gardens shall remain under Provincial management, instead of being handed over to the care of local bodies.

8. Of the great impetus given to agricultural improvement by the enlargement of the Department during the last few years the Chief Commissioner has seen many evidences. The demand that is arising for superior seed and improved implements is one of these. But the principal feature is the interest awakened in improved methods, and the increased confidence in the advice of the Department which has become apparent to any one conversing with intelligent land-holders.

Public criticism is often directed to the slow progress achieved, and to the insignificant results obtained by the Agricultural Department, but to the Chief Commissioner it seems more surprising what a great advance has been made in the space of a very few years in bringing the work at the Farms into touch with the people. Once that touch has been attained, the movement is bound to spread, and the extension has already begun. The Chief Commissioner looks forward with confidence to the successful administration of the Department under Mr. Sly, to whose initiative so much of the advance made has been due. He has read with much pleasure the remarks in paragraph 32 of the Report in which the acting Director Mr. Low testifies to the manner in which the European experts have succeeded in adapting themselves to their new environment.

Mr. Craddock desires specially to notice the excellent practical work done by the Deputy Director Mr. Clayton. He has heard with regret that the Assistant Director Rao Bahadur R. S. Joshi, whose long services in the Department have been repeatedly commended, has been hampered by ill-health. Lastly he wishes to impress on District Officers the necessity of keeping in touch with the work of the Department, and of stimulating their District Agricultural Associations to greater interest and more practical endeavour in the cause of agricultural improvement.

ORDER.—Ordered that a copy of this Resolution together with the enclosures be submitted to the Government of India in the Revenue and Agriculture Department, and that copies be forwarded to the Director of Agriculture and to all Commissioners and Deputy Commissioners, Central Provinces, for information and guidance, and that it be published in the supplement to the *Central Provinces Gazette*.

W. N. MAW,

Second Secretary to the Chief Commissioner,

Central Provinces.

Sectt. Press, Nagpur : - No. 2522, Civil Sectt. —27-12-07—680.

No. 2693.

FROM

C. E. LOW, ESQ., I. C. S.,

DIRECTOR OF AGRICULTURE,

Central Provinces,

TO

THE SECRETARY TO THE HON'BLE THE CHIEF COMMISSIONER, CENTRAL PROVINCES,

AGRICULTURE DEPARTMENT.

Nagpur, the 6th September 1907.

SIR,

I have the honour to forward for the information and orders of the Hon'ble the Chief Commissioner, the Report on the working of my department for the year 1906-07. The Report is based mainly on notes by Messrs. Clouston and Evans, and on a few notes left me by Mr. Sly.

I have the honour to be,

Sir,

Your most obedient Servant,

C. E. LOW,

Director of Agriculture.

Report on the working of the Department of Agriculture, Central Provinces, for 1906-07.

I.—ADMINISTRATION.

Controlling Staff.

1. Mr. L. E. P. Gaskin, I. C. S., held charge of the Department up to 28th February and Mr. F. G. Sly, I. C. S., from that date till the close of the year. The office of Deputy Director was held throughout the year by Mr. D. Clouston: that of Agricultural Chemist by Mr. F. J. Plymen: and that of Principal, Agricultural College, Nagpur, by Mr. G. Evans, since his arrival in India in October last. Mr. Joshi continued to fill the post of Assistant Director of Agriculture, except for a period of 3 months towards the close of the year, when he was on leave. Mr. Clouston is in charge of the farms elsewhere than at Nagpur, and visits Agricultural Associations and demonstration plots in the south of the Province. Mr. Evans supervises the Nagpur Farm, and Mr Joshi visits Agricultural Associations and demonstration work in the Plateau districts. It was proposed to put Mr. Evans in charge of the farms and demonstration work in the north of the Province, on his being set free by the expert who was expected to arrive this spring; as, however, this expectation was disappointed, there is at present no satisfactory arrangement possible for the supervision of work in the northern districts, which is looked after partly by the Director of Agriculture and partly by Mr. Clouston, the Deputy Director of Agriculture. The want of a Botanist is also much felt.

Subordinate Staff.

2. Sanction was received just before the close of the year to an increased cadre consisting of 10 first class Agricultural Assistants drawing from Rs. 150 to Rs. 250 and of 32 second class Assistants drawing from Rs. 50 to Rs. 100, also of 4 probationers. There is no intention, however, of immediately filling up this cadre, which will only be worked up to as recruits become available and the senior men become capable of carrying out the duties to which the higher grades of pay are attached. Three men at present draw Rs. 100 and upward, and 16 from Rs. 40 to Rs. 100: there are also 9 probationers drawing from Rs. 25 to Rs. 40. Nearly half the new men are drawn from the Settlement Department; these are not so ready to undertake the hard physical work required of them, as those who have worked in the Agricultural Department all along. Of the men sent to Pusa for training, the Agriculturist is a success; but the men sent for a course in Mycology and Agricultural Chemistry are not at present likely to be fit for much beyond the work of demonstrators and are in no sense suitable for Assistants to the Professors. It is hoped that men who have specialized from an earlier date and done more practical work will turn out better.

Of the subordinate staff, 15 men were employed on the various Provincial farms; 2 on cotton seed farms; 4 on demonstration plots; the Sericulturist was on deputation at the Bengal silk farm, Chaibassa; 2 men were engaged in Entomological work; and 2 men's services were lent, one to a private employer, and one to the Court of Wards.

Financial.

3. The budgetted expenditure of the Department for the financial year 1906-07 was Rs. 2,61,993; but it proved impossible to spend the entire sum, and Rs. 50,885 were allowed to lapse. The main cause for this was the inability to recruit enough Agricultural Assistants to fill the cadre, and fully to carry out the programme of experimental and demonstration work. This difficulty is now in course of being obviated. Another cause was the non-receipt of sanction to the proposals for establishment. The provision in the budget for 1907-08 is Rs. 3,40,053.

II.—AGRICULTURAL EDUCATION.

Agricultural College.

4. The Agricultural School was this year raised to the status of a college with a three-year course. Owing to the small number of pupils the year's report makes very poor reading, but as the cause to which this is due has now ceased to exist, it is not necessary to discuss it in detail. A rise in the qualifications demanded of

candidates, with a lowering of the initial pay offered by the Settlement Department, from Rs. 25 to Rs. 15, combined with general ignorance of the scale of pay offered by the Agricultural Department, had caused an almost complete absence of candidates, the numbers that remained throughout the year being only 4 in the junior and 5 in the senior classes, respectively. Fortunately, the publication of the Departmental prospectus caused a great change in the recruiting this year; no less than 32 are at present receiving instruction in the first year class. The Settlement Department has also agreed to offer a minimum salary of Rs. 30 to passed Agricultural College students. Some progress was made in supplying the College with laboratory fittings, but the construction of the joint agricultural laboratory has not yet been started.

5. The new students are almost without exception members of the literary castes, and are mainly Brahmins from Nagpur. The advantages that the Department has to offer seem scarcely appreciated in the northern districts, the Deputy Commissioners of which will, it is hoped, do their best to remedy this defect. We have on our books also students from Mysore, Central India, Poona, and Eastern Bengal.

Mr. Sly thought (and I share his opinion) that games should be organized among the College students. A beginning is being made in this direction, and a sports club has been organized in the College, considerable keenness being shown by the students.

Malguzari Class.

6. Several of the students of the Malguzari Class left the College during the year and returned to their homes; and the 10 who remained were all scholarship holders. The class will not draw recruits from the best sources, until our Agricultural Associations have made their presence felt and the land-owners of the Province have begun to realize for themselves the advantages of an agricultural education. The progress of the agricultural associations is such as to afford hopes of this expectation being realized at no distant date.

It has been at last decided to hand over the Normal class and its Instructors to the Educational Department.

Agricultural Gazette.

7. The circulation of the Gazette has increased by 356 copies monthly, of which 308 were for subscribers and 48 on account of additions to the free list. As a district officer during the year under report, I considered that the Gazette had increased in interest, originality and usefulness. It is appreciated by the people, many of whom came from distant villages to the farms to buy the seed which they had seen advertised in the Gazette. Three especially interesting articles were those by Mr. Clouston on (1) "Some useful foreign implements and machines at the Nagpur Farm," (2) "Manurial experiments with wheat" and (3) "Nitrate of soda as a fertilizer for cotton."

Six leaflets explaining the method of growing certain crops and one on the use of nitrate of soda as a manure for cotton were distributed with the seed and manure in question; and a booklet on some useful foreign machines and implements at the Nagpur Farm was published; but the Agricultural Gazette is now so widely circulated that it is the best means of disseminating useful information and the need of booklets or leaflets does not often arise.

III.—Agricultural Enquiry and Experiment.

Experimental Stations.

8. A full account of the work done on the farms will be found in the appendices to the report on the Experimental Stations, but I wish to draw attention here to some of the more noteworthy features of the year's work.

Akola.

9. The work was carried on under much difficulty owing to the housing accommodation for the staff not being ready. The buildings are now nearing completion, the land has been tested by noting the results of a crop of juar grown on it and an area selected of a

homogeneous nature for experimental plots. Precautions are being taken to prevent scouring, a cause which spoiled the series of experimental plots on the Hoshangabad Farm. The non-experimental area will be used mainly for the growing of selected seed of cotton and juar, and a beginning has already been made in the production of the seed required to start with; but owing to the present lack of trained selectors the preliminary work is going on at Nagpur and Akola under the directions of Mr. Clouston. We have no one capable of doing this at present save our European experts. Saoner juar was grown this year and much appreciated by the Berar cultivators. The site chosen for the Farm appears a suitable one.

Hoshangabad.

10. The new land seems likely to prove of more even quality and more satisfactory than the old, which was much injured by scouring, a defect which it is hoped to remedy sufficiently to make the area suitable for seed growing, if not for experiment. An excellent set of additional buildings have been completed and a road has been made. The new land has been brought into a good state of tilth by the use of the Turnwrest plough, and is being tested to determine the plots most suitable for experimental work. The most interesting work done on the farm this year includes the experiments showing the efficacy of green-soiling with *san* hemp, the advantage of sowing kharif crops in lines as against broadcast sowings, and the growing of Russian flax, the fibre of which is now being tested.

Raipur.

11. No additional land was taken up, but more of the existing land was put under cultivation. The great advantages of transplantation under irrigation, compared to the various local methods of sowing broadcast, continued to be shown by experiment. The importance of this improvement is self-evident, when it is remembered how necessary it is to induce the cultivators to meet the great efforts that Government is making to spread irrigation in Chhattisgarh, by a corresponding advance in their style of cultivation, that will enable them to take full advantage of the facilities now to be offered them at such a heavy cost to the general revenues. Juar was fairly successful, though it needed drainage; but the neighbourhood of Raipur would seem unsuitable for cotton. Bone dust gave good results as a manure; it is feared, however, that it cannot be obtained cheaply enough to be used at a profit. Groundnuts gave good results, and a beginning was made in growing sugarcane. Jute has done very well with early sowings in the hot weather under irrigation, reaching a height of ten feet this year; but its fibre has yet to be tested for quality. Should sufficient irrigation be available at the right time of year, this will prove a most important addition to the commercial crops of Chhattisgarh, as it yields much more profit per acre than rice, even if the present prices be maintained.

Nagpur.

12. The staff was busily employed in getting the additional area of 189 acres, intended for the production of seed, into proper order. A new range of buildings and a system of farm roads are under construction. The 9-inch pipe line from Telinkheri, constructed some years ago by the Public Works Department, has not hitherto been of any use and irrigational experiments continue to be crippled for lack of sufficient water.

The monsoon set in with unusual violence, with the result of some failure of germination, which was remedied where possible by dibbling in fresh plants. The most interesting work done was that undertaken in connection with the wilt disease in tur, the rust-resisting capacity of the various wheats and the seed selection of cotton. Mention has been made of these matters elsewhere in this report.

Experiments in connection with the residual effects of manures go to show that the effects of bulky organic manures are more persistent in unirrigated than in irrigated land. A very important experiment, which has not been in progress long enough to warrant any very certain conclusion being drawn from it, is that regarding cotton manures. So far as it has gone, it tends to show that for the Nagpur soils nitrogenous manures are the most important. Next to cotton, wheat and tur, awned bajra (*Pennisetum Typhoideum*), Jaunpur maize, and Saoner juar were the most important crops grown for seed distribution.

Demonstration Farms.

13. Demonstration plots were worked at Semri in the Damoh District, and Bhatapara during the year. The object of the former was to show the advantage of sowing kharif crops in lines. Mr. Sly visited the plot during the year, and considered the soil unsuitable. Another plot will be arranged for. The green soiling of wheat with *san* hemp proved advantageous on this farm.

The plot at Bhatapara, which was cultivated to show the possibility of growing cotton and juar in Chhattisgarh, was abandoned after the close of the year, its object having been fulfilled. Local cultivators, however, have not followed the example set them. The *juar* crop was much damaged by pig and birds.

Cotton Seed Farms.

14. The distribution of cotton seed is now, it would appear, on a sound basis. Seed farms were carried on at Saoner, Yeotmal and Risod, in each case under the supervision of an Agricultural Assistant who saw that the crop was grown under the best conditions for seed production. Seed was sold by the Department from two only of these centres, the owner of the Yeotmal farm having asked to be allowed to distribute the seed himself to the cultivators of his own village. The seed was in each case ginned by a Platt's gin, worked at a low rate of speed by bullock power, so as not to risk breaking the seed. The total amount of seed purchased by the Department was 9,200 lb. of Jari from the Saoner Farm and 1,200 lb. of Bani from the Risod Farm, of which 140 lb. were picked from selected plants by the Agricultural Assistant in charge. The advertisement of this seed in the Agricultural Gazette led to a very great demand for it, especially for that from Saoner, where the main responsibility, it is only fair to say, rested on the owner of the plot, Raghoba Ratiram Arole. Under present conditions, the seed obtained from these cotton seed farms should be as good as the best seed grown by the most skilful cultivators in the Province; but it has no real title to the name of "selected," and until the practice of selection has become effective, no real improvement is likely to be effected in the quality of seed grown. As there are no assistants as yet qualified to perform the operation of selection, this will have to be done at head-quarters by the expert staff for the present.

15. Seed selection on the Nagpur farm has, during the year under report, received a good deal of attention. The varieties operated on were Upland Georgian, Bani and the three varieties of Jari. A few plants out of many thousands were selected in the case of each variety; in making the selection, the plant's vigour of growth, freedom from disease, shape, number of bolls, quality and length of staple were all taken into consideration. The seed from each plant was sown in a different line and the very best plants will again be selected from these this year. It will be possible in this way to supply the cotton seed farms with specially selected seed of an improved strain every year; they will grow it on improved lines, special attention being paid to soil, manuring and the spacing of the plants. A beginning will be made on these lines next year.

16. The patel of Risod has obtained the services of Narhari Sitaram, the Agricultural Assistant in charge of the seed farm, on deputation, as manager of private cotton seed farm, a satisfactory testimony to the class of official turned out by the Department.

Distribution of Implements and Machinery.

17. The demand for agricultural machinery continued and more implements were ordered than the Department could supply. Turnwrest ploughs and winnowers were most in favour, but there was a great falling off in the number of fodder-cutters asked for. Orders were received not only from the Central Provinces, but from other parts of India, and there is good reason to believe that the demand was largely stimulated by the article in the Agricultural Gazette on the machinery and implements which had proved a success on the Nagpur Farm.

The wood used in the construction of the machine by the American manufacturers does not stand the Indian climate well, and attempts are being made to replace it with sheet iron. The accounts of the implement depôt, which had

fallen into some confusion, were examined during the year and the system of ordering and supplying machinery was put on a more satisfactory basis. With the continued increase in the cost of agricultural labour, there seems a very large scope for the efforts of the Department in this direction; and it will be one of the most important duties of its officers to discover for what operations machinery can be advantageously used; and, by examining the machines actually at work in the hands of private owners, to find out their weak points and suggest methods of improving them.

Distribution of Seed.

18. An increase took place in respect of almost every kind of seed supplied by the Department. The only decrease was in respect of the mill-ginned cotton seed supplied last year. This seed was in no sense selected, and in many cases gave inferior results; its distribution was not continued this year and if the quantity so distributed be deducted from the total distributions of last year, the figures of this year show a very great increase indeed. This important expansion of the Department's work is due mainly to the information contained in the Gazette, the starting of the Berar Experimental Farm and the establishment of the cotton seed farms on a sound basis. The general opinion of the members of the District Associations was that the cotton obtained from the seed from the Saoner Farm was better than their own; but not better than that grown in some of the best *Jari* tracts of Berar, *e. g.*, round Akot in the Akola District.

Saoner juar proved in great demand. It was grown most successfully on the Akola Farm and no less than 18,230 lb. were sold in Berar where this superior juar has been hitherto comparatively unknown. The demand at Nagpur has also been good; and 11,616 lb. were disposed of to cultivators. Nagpur early ripening *tur* sold well in districts in which late varieties suffer from frost.

In the rice tracts, Nasik and Safeda paddies have found favour; the former is an early variety from Bombay and the latter a medium variety from the Punjab. Both have been tested and have done well on the Raipur Experimental Farm.

The use of Sulphate of Copper.

19. The method of applying sulphate of copper to juar seed as a fungicide was demonstrated at fixed centres in six districts. Practical demonstrations were given in each case by the assistant in charge, and 8 cwts of copper sulphate were distributed gratis in small lots, a quantity sufficient to deal with more than 160,000 lb. of juar. Besides this, nearly 1 cwt. was distributed along with the juar seed sold from the Nagpur and Akola Farms.

The practice of pickling with copper sulphate has become so well known in Nimar that demonstration in that district was judged unnecessary this year, and, on the advice of the Deputy Commissioner, the Agricultural Asistant handed over his stock to the Tahsildar for distribution. Mr. Sly was informed that the use of this chemical had become a regular agricultural practice in many villages.

Meagher system of sewage.

20. The Meagher system of sewage disposal was demonstrated at Damoh, Itarsi, Khandwa and Wardha during the year; but the prejudice against the use of this form of manure is still too great to admit of its being taken up to any considerable extent by cultivators, successful though it has proved in practice.

Sugarcane Experiments.

21. These experiments were not continued during the year, but an attempt was made to introduce the use of the iron cane mill into the Balaghat District under the auspices of the Court of Wards, with the result that a Beheea mill was taken and worked on hire by cultivators for several weeks. On the advice of Mr. Sly, arrangements were made to obtain a *mistri* from the United Provinces for next season when several mills will be lent out on hire and the most successful and popular type selected.

Rust-resisting Wheat Experiments.

22. A very interesting series of experiments were conducted by Mr. Evans in order to discover which of our local wheats was the best rust-resistant. Several foreign wheats were also

tried. The Nagpur hybrid wheat did not prove itself superior to other varieties in this respect, and the best results were given by the Bansi variety. Late rains, cloudy and wet weather in February, combined with irrigation, made the test a very severe one. Some work was done in the same direction about 4 or 12 years ago at the Nagpur Farm, but the constant succession of dry years rendered it very difficult to get definite results. It is hoped now to continue the experiments to a definite conclusion by the help of irrigation.

Collection of Wheat and Tur varieties

23. A collection of the different varieties of wheat and tur was also undertaken, and they were classified by Mr. Evans. A similar collection of varieties of kharif crops is now to be attempted. The liability of the different varieties of tur to wilt was also examined by experiment. It was found that the late ripening varieties of the northern districts, which are especially liable to frost damage, are comparatively free from wilt.

Work carried out by and in connection with the Irrigation Department.

24. Experiments in irrigated wheat as a second crop after rice were, whether undertaken by this Department, the irrigation officials or the district staff, uniformly unsuccessful.

The general cause was the cold weather rains which induced rust; but it is to be regretted that, in the case of the demonstration plots managed by this Department, the late sowings, consequent on the selection of unsuitable plots and other causes, should have been so largely responsible for the failure. An inferior tilth characterized the plots prepared under the guidance of district officials and seen by the present writer, in whose experience linseed was more successful than wheat. In judging of the results, however, it must be remembered that they represent a second crop, and an outturn of 400 lb. of wheat after a crop of fairly late rice, which was obtained in some cases, is far removed from a complete failure. A good beginning has been made this year with the demonstration plots in Raipur; transplantation is proving itself a success in the eyes of local cultivators, to whom a quantity of seedlings has been given for transplantation; better supervision and more efficient cultivation have been arranged for and it is hoped that this year may see more successful results.

25. In Saugor, Damoh and Seoni work on wheat embankments was in progress; 53 old works and 7 new ones were under construction and a sum of Rs. 33,086 was spent on them during the year.

The average yield per acre over the area of 328 acres embanked by Government in the Damoh District was 420 lb., but as the crops of two of the embanked fields were severely damaged by hail and rust, these results are better than would at first sight appear.

Agricultural Chemist.

26. The Agricultural Chemist has been throughout the year under the serious disadvantage of having no building to work in and having to depend on the Agricultural College for his laboratory equipment. The need for the joint laboratory building is much felt and it is hoped that it will be possible to start its construction at an early date.

Under these circumstances it is not surprising that Mr. Plymen was unable to accomplish much of his proper work during the year; but a beginning has been made in soil analysis.

The Agricultural Chemist was on tour for some part of the year, investigating the cultivation of the sugar industry of the Province, a report on which was read and discussed at the Cawnpore meeting of the Board of Agriculture. Mr. Plymen also examined the possibilities of artesian well irrigation in the Nimar District, analysed several samples of manures, and reported on the composition of saline deposits from the Lonar lake and coal from the Balharpur Colliery.

He also lectured on Physics and Chemistry to the three English classes of the Agricultural College.

Agricultural Associations.

27. Substantial progress and improvement was made by the Agricultural Associations during the year. They have shown themselves willing enough to try the various seeds, implements and manures recommended by the Department after testing them on its own farms ; in fact, these bodies are inclined to be a little too venturesome and often propose or initiate experiments, of the success of which there is no reasonable hope to start with. For this and other reasons it is necessary that an expert should be present at all meetings of agricultural associations. It is also desirable that the *bona fide* agricultural class should be better represented ; there are in many cases too large a proportion of townsmen, who may own villages but are not in any sense of the term practical agriculturists. It would probably not be desirable at present to increase the membership ; and a little more care is necessary on the part of district officers in making future selections. Not much has hitherto been done in following up the work of members in their villages ; and it would increase the interest taken by them and give a useful check on reported results, were Deputy Commissioners and Agricultural Assistants to visit as many members as possible in their own villages and examine the plots sown by them. It has been a frequent complaint in the past that seeds or manures have been sown or applied in unsuitable ways owing to lack of knowledge ; to remedy this, the system has been adopted, at Mr. Clouston's suggestion, of despatching with each consignment a leaflet, containing precise instructions as to the method of dealing with it.

Associations which are reported to be doing good work are those of Buldana, Nimar, Amraoti, Wardha, Hoshangabad and Nagpur.

IV.—Museums.

Museum.

28. Substantial progress was made in the re-arrangement of the Nagpur Museum. The geological exhibits have been transferred to the Economic Museum which is being established in the Victoria Technical Institute. The Director of Geological Surveys has laid the Department under great obligations by the classification and cataloguing of specimens carried out under his instructions. The same has been done for the archæological collection by Pandit Hirananda whose services were lent to the Museum Committee. A Taxidermist has been appointed, and it is hoped that district officials will assist in finding specimens for him to set up. A pamphlet, containing instructions for preparing specimens for despatch to the Museum, has been printed and circulated to assist them in doing so. The great want is a good Curator, a type of man not easily procurable in India. Mr. Sly before handing over charge had applied for sanction to the appointment of an Archæological Assistant for this purpose. The more important additions during the year were 2 sets of copper plates from the Betul District, 9 images from Chanda, 2 inscribed stone slabs from Seoni and 263 coins presented by the Government of the United Provinces, the Bengal Asiatic Society and the Bombay Branch of the Royal Asiatic Society.

A gallery was added to the west room during the year. The number of visitors declined from 137,940 to 123,559. An expenditure of Rs. 2,274-2-4 was incurred on the maintenance of the Museum, leaving a balance of Rs. 4,481-15-7.

The number of visitors to the Raipur Museum was 85,872 against 116,993 for the 15 months dealt with in the last report. An inscribed stone slab and an old cannon presented by Mr. Napier were the principal additions to the collection.

V.—General.

Tussar Cultivation.

29. I regret to have to report that still further delay has occurred in starting this experiment.

No reply was received from the Deputy Commissioner, Chanda, till some 8 months had elapsed, which made it impossible to start a tussar nursery in 1906 ; and it was then thought advisable that the site should be chosen and

the nursery managed by a trained Sericulturist. The Sericultural Assistant, who did not possess the necessary qualifications for this purpose, was sent to the Bengal silk farm at Chaibassa for further training. Mr. N. G. Mukherji, Assistant Director of Agriculture, Bengal, who had made a special study of tussar silk having unfortunately died, there seems some reason to believe that the experiment is hanging fire a little in Bengal, and it may prove that the training available at Chaibassa is not sufficient.

30. The weaving class consisted of 2 reformatory boys and 3 boys under training in receipt of an allowance. Mr. Sly did not consider their progress satisfactory, and I do not imagine much good will ever be done with the introduction of the fly shuttle unless it is taken up more seriously and on a larger scale. Should such an attempt be made, I understand that assistance from private sources is likely to be forthcoming.

General.

31. It having fallen to my lot (for the second time) to write this report immediately on taking charge of the Department, I do not feel capable of making any general remarks of value. Mr. Sly left it on record that he was very well satisfied with the work of the Administrative staff generally. Mr. Clouston, he considered, had done excellently, and worked most zealously on good practical lines. Mr. Plymen had not, Mr. Sly has stated, had much chance, owing to bad laboratory accommodation; and had not been able to make any real start in research work; but his teaching was successful. Mr. Evans had done his best as Principal of the Agricultural College, but he was more suited for the post of Deputy Director of Agriculture, in virtue of his training as an expert agriculturist. Mr. Sly was pleased with Mr. Evans' work on wheats. Mr. Joshi had latterly suffered much from ill-health. He has been in special charge of the Telinkheri Farm and of the work in connection with demonstration and Agricultural Associations in the plateau districts.

Mr. Sly considered that Bhayalal Dube had done good work under difficult conditions in connection with the Akola Farm.

32. Perhaps I may be allowed to make a few remarks from the point of view of an outsider. I was agreeably surprised in returning to the Department to find to what an extent the European experts had succeeded in familiarizing themselves with the various styles of local agriculture and that in certain cases their expert knowledge had already detected and remedied certain errors of method in the Department's work. The most urgent need now is for them to equip themselves by careful study of the language and local customs, for that facility of communication with the people for whom they are working, which can alone give them the knowledge and influence that is so necessary, and put them in a position to collect facts and spread agricultural knowledge.

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REPORT

ON THE

DEPARTMENT OF AGRICULTURE

IN THE

CENTRAL PROVINCES

FOR THE YEAR

1907-08.

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No. 683 / XIII—18-12.

CENTRAL PROVINCES ADMINISTRATION.

Agriculture Department.

Nagpur, the 9th December 1908.

READ—

Report on the Department of Agriculture, Central Provinces, for the year ending the 30th June 1908.

READ ALSO—

Report on the Agricultural Stations for the same period and letter No. 3052, dated the 23rd September 1908, from the Director of Agriculture, forwarding the same.

Report on the management of the Provincial and District Gardens in the Central Provinces for the same period and letter No. 3312, dated the 9th October 1908, from the Director of Agriculture, forwarding the same.

RESOLUTION.

During the year under review the superior staff has been completed, so far as present requirements are concerned, by the arrival of the Principal of the Agricultural College, setting free Mr. Evans for work in the north of the Province as Deputy Director. The staff now consists, besides the Director, of two Deputy Directors in charge of demonstration and experimental work in the Province as well as of the Principal and two scientific experts mainly engaged in work at Nagpur connected with the College.

2. Of the subordinate staff of Agricultural Assistants the majority were employed at experiment stations or on demonstration. Seven out of the total number of 27 have had, or are having, some training outside the Province, and the rest were recruited either from the Land Record Department or are passed students of the Agricultural College. As students pass out of the College the field of selection will be gradually widened and though the majority of these men have done fairly satisfactorily, in the course of a few years a higher standard may be expected. Two candidates are in training at Pusa, one with a view to his appointment as Assistant Economic Botanist, another will lecture on Entomology at the College on completion of his course.

3. The conversion of the Agricultural School into a College was carried into effect during the year, but it will be some years before the full results of the change will be apparent. Owing to insufficient grounding in past years, only 3 students of the previous year remained to take the third-year course and only one student out of 3 secured the diploma. Progress has, however, been made in other directions. The syllabus has been altered, plans and estimates for the new laboratory have been passed, classes are growing, passes obtained, and amongst the first-year students promising material is reported. Disinclination to practical work, which has caused violent fluctuations in the numbers of students of that year, continues the main obstacle to success, and the Director proposes to prescribe an actual practical test before admission, which should go far to remove it.

4. The utility of the malguzari class continues to be retarded by the failure of the boys after passing through the course to put in practice what they have learnt. This reluctance must gradually disappear, as more of the methods inculcated by the Department pass beyond the experimental stage. Meantime, much may be done by increased care in the selection of the family from whom the boy is taken and by the continued cultivation by the master of friendly relations with him after he has left the class. The former matter, which is too often left in the end to the discretion of the Tahsildar, is one in which a Deputy Commissioner, with knowledge of the land-owners of his district, can render material assistance. District officers should also take every opportunity of visiting the farms belonging to pupils or their guardians, when in the neighbourhood, and encouraging them in the application of the lessons they have learnt.

5. The Agricultural Gazette continues to increase in popularity and the articles contributed to it are now of a high standard of merit. Carefully translated, it proves a useful means of keeping a certain class of cultivators in touch with the work of the Department, and the increase in its circulation from 2,995 to 3,140 is satisfactory.

6. The unfavourable character of the monsoon which closed in September seriously interfered with experimental work, and it was only in the Raipur Station that reliable results were generally obtained. In Akola the separate cultivation of the four varieties of cotton commonly grown together under the name of *jari* or *kati vilayti*, but all botanically distinct, has been carried out. Experiments up to date have tended to show the *malvensis* variety which has the longer staple to have been the most profitable in a year when the value of the lint was high. The *buri* cotton imported from the Sonthal Parganas of Bengal promises to be a valuable crop, and its progress in the estimation of cultivators and spinners will be watched with interest. In Labandih the problem how to improve the breed of bullocks so as to render them fit to meet the requirements of a more careful cultivation has led to experiments in fodder grasses and fodder crops. At present a wild lucerne is being tried, but final conclusions have not yet been arrived at. Another experiment, which is likely to be profitable, shows that October rain is not essential to a medium paddy grown on *matasi* soil, which is plentifully irrigated in the preceding months.

The character of the monsoon greatly impeded operations in Powarkhera and Nagpur. But jute was sown with most successful results beneath Telinkheri and the possibility of growing the crop with profit in these Provinces below tanks, which retain water in the hot-weather, has been fully demonstrated.

7. The most successful demonstration work was carried out in Chhattisgarh by Mr. Clouston in co-operation with the Irrigation Officers, where very practical results have already been achieved. The object has been to replace by transplantation the present method of rice cultivation and already as a result of the demonstration 1,000 acres have been put under transplanted rice by the cultivators themselves. Mr. Clouston is using every effort to perpetuate and spread the movement by the loan of trained ploughmen to neighbouring malguzars and the provision of a local training class. Undoubtedly an excellent beginning has been made and the results will be watched with interest.

8. The cotton-seed farms have now been in existence for 3 years, and though the experiment presents some encouraging features, the object to be attained, *viz.*, the supply of superior seed by private agency, seems to be still remote. In the Chief Commissioner's opinion, efforts should now be directed rather to freeing the farms from dependence on Government than to starting fresh ones. If the value of the seed produced is 50 to 100 per cent higher than ordinary hand-ginned seed, as the experiment at Wardha would indicate, there is every hope that it will be only a matter of time before the farms will become self-supporting. The cost of the experiment, *viz.*, Rs. 1,079, was defrayed by funds placed at the disposal of the Government of India by the British Cotton Growing Association.

9. With the enlargement of the staff a considerable amount of analytical and research work has been carried out. An analysis of soils, surveys and

classification of various varieties of crops and study of insect pests have occupied their time, and, though the results are not always immediately recognizable, a useful foundation has been laid for discoveries, which may be of considerable benefit to the cultivator in the future. As a result of his enquiries Mr. Evans has discovered the existence of a very serious pest in the potato, and an attempt will be made to deal with it in the current year.

10. The much-needed work of re-arrangement of exhibits at the Nagpur Museum has been in the capable hands of Mr. Basant Ram, Archæological Assistant, and has made good progress during the year. A taxidermist was also employed during the greater part of that period, and a considerable number of birds have been set up. It is satisfactory to find that there has been an increase of visitors to the Museum from 123,859 to 176,640.

11. The arrangements for the provision of stud bulls are not yet on a satisfactory basis. The cattle on the two Government breeding farms were in good health during the year with the exception of two small and quickly suppressed outbreaks of foot-and-mouth disease, and the number of births was satisfactory, but many of the Malvi cattle at Powarkhera are not true to type and the herd requires new blood. Steps are being taken to import a bull and cows of good class from Gwalior. The neglect by malguzars of bulls lent to them is an obstacle to the utility of these farms, and an alteration in the arrangements for the utilization of the bulls produced on the farms is under consideration.

12. Certain of the simpler implements recommended by the Department are gradually obtaining a sale, chief of which are the turnwrest-plough, corn-shellers, American winnowers and chain pumps. It is doubtful whether the more elaborate labour-saving appliances imported from America will ever find much favour in a country where labour is cheap. The proposed agency for repairs if carried out is likely, however, to give an impetus to the sale of all kinds of implements, and the Chief Commissioner hopes the Director will be able to give the scheme a trial.

13. Though the experimental cultivation carried out by members of the Agricultural Associations unaided is, mainly owing to want of knowledge and of supervision, not always successful, the Chief Commissioner attaches great weight to the organization of these Societies. They constitute a representative body of land-owners familiar with the objects and aims of the Department, and, as the experience in Raipur proved, are, when occasion arises, useful intermediaries in the introduction of improved methods. Though, owing to the appointment of two Deputy Directors, their meetings are now attended by members of the Department, it is not intended that the interest of Deputy Commissioners in their proceedings should in any way slacken, and the Chief Commissioner trusts that Deputy Commissioners will continue by attending and encouraging the meetings to take advantage of one of the most effectual means of assisting the cause of agricultural improvement that is within their reach.

14. In spite of the early cessation of the rains the majority of the District Gardens did well. In the Maharaj Bagh irrigation by iron pipes was extended and new lawns and roads were made. The number of plants sold rose from 8,770 to 10,600. At Telinkheri the Superintendent deserves credit for the improvement in appearance he has effected. The new garden at Pagara gave a good supply of vegetables, and it is hoped that it will in time be self-supporting.

In District Gardens receipts have risen from Rs. 6,261 to Rs. 7,402, but expenditure also has more than kept pace with receipts, increasing from Rs. 13,983 to Rs. 18,815. This increase is explained to be due to the payment of grain compensation and high price of fodder for bullocks. There was a rise in the number of trees issued gratis and sold, the districts of Saugor, Hoshangabad, Raipur and Balaghat doing best in this respect.

15. Mr. Standen, who wrote the report, was in charge of the Department for only one month of the year, Mr. Sly occupying the post of Director for 6 months and Mr. Low for 3. The Chief Commissioner is greatly indebted to

these officers for their work and he regrets that, owing to the needs of the Province elsewhere, it was impossible to give the Department with its increased staff and multifarious sphere of duties the benefit of their experience for any longer period. In any country the promoters of the cause of agricultural improvement must be prepared to face the disheartenment caused by opposition and prejudice and he considers that the progress made is satisfactory.

Mr Sly has now severed his connection with the Directorship, and the Chief Commissioner desires to express his great appreciation of the debt which the agricultural interests of the Province owe to him, for initiative which has been wide reaching and yet cautious, and for supervision which has been complete and yet most tactful. He considers that the Province has been most fortunate in its expert officers who have been working most wholeheartedly and harmoniously under the wise guidance of Mr. Sly, and his successors, Messrs. Low and Standen, and he wishes especially to acknowledge the valuable work done by Mr. Clouston in Chhattisgarh.

ORDER.—Ordered that a copy of this Resolution, together with the enclosures, be submitted to the Government of India in the Revenue and Agriculture Department; and that copies be forwarded to the Director of Agriculture and to all Commissioners and Deputy Commissioners, Central Provinces, for information and guidance; and that it be published in the Supplement to the *Central Provinces Gazette*.

R. G. PANTIN,

Third Secretary to the Chief Commissioner,

Central Provinces.

Govt. Press Nagpur:—No. 1831, Civil Sectt.—10-12-06—545

No. 2949.

FROM

B. P. STANDEN, ESQ., I. C. S., C. I. E.,

DIRECTOR OF AGRICULTURE,

Central Provinces,

TO

THE SECRETARY TO THE HON'BLE THE CHIEF COMMISSIONER, CENTRAL PROVINCES,

AGRICULTURE DEPARTMENT.

Nagpur, the 18th September 1908.

SIR,

I have the honour to submit, for the information and orders of the Hon'ble the Chief Commissioner, the report on the working of the Agricultural Department, for the year 1907-08.

I have the honour to be,

Sir,

Your most obedient Servant,

B. P. STANDEN,

Director of Agriculture.

REPORT

ON THE WORKING OF THE

DEPARTMENT OF AGRICULTURE,

CENTRAL PROVINCES,

FOR THE YEAR 1907-08.

PART I.—ADMINISTRATION.

Controlling Staff.

The post of Director was held by Mr. Sly for rather more than half the year, by Mr. Low for three months, and by myself for the last month of the year. Mr. Clouston was in charge of the current duties for the remaining period. These changes were prejudicial to the progress of the department and would have been still more so had it not been that those operations, which at present require most attention, were in the capable hands of Mr. Clouston throughout the year. Mr. Allan arrived at Bombay in November and took charge of the post of Principal of the Agricultural College at the end of that month, relieving Mr. Evans, who was posted as Deputy Director of Agriculture, Northern Circle, with his head-quarters at Hoshangabad. Mr. Graham, who had been working for some months as Supernumerary Economic Botanist at Pusa, joined these Provinces as Economic Botanist on February 14th. The Assistant Director of Agriculture was in very bad health during the first nine months of the year, and went on long leave in March. The superior expert staff is now complete so far as present requirements go, since it has been finally decided not to entertain provincial experts in Mycology and Entomology. Mr. Clouston controls the experimental and demonstration work in the Berar and Chhattisgarh Divisions and Mr. Evans in the Jubbulpore and Nerbudda Divisions. Mr. Allan is in charge of the College and lectures on agriculture; he also manages the Nagpur farm which is utilized for the practical training of students as well as for experimental work. Mr. Plymen and Mr. Graham lecture at the college and undertake original research work.

Subordinate Staff.

2. The staff of agricultural assistants was increased by three during the year. The distribution of the staff varied during the course of the year: four remained in charge of experiment stations throughout the year, and for the greater part of the twelve months the rest of the staff was employed as follows:—2 were on foreign service, 4 were employed on demonstration, 2 were in charge of cotton seed farms, 1 is the entomological assistant, 1 was engaged in establishing a tussar-rearing station, and the remainder were working on the four experimental stations as overseers or probationers. Of these 27 men, 10 were recruited from the Land Record Department, 4 are Poona Licentiates of Agriculture, 1 is a B. A., 1 is a passed student of the agricultural school, who has had a year's training in agriculture at Pusa, 1 secured the diploma of the Nagpur College during the year, and the rest are passed students of the agricultural school, who were appointed direct to this Department. A few of the assistants employed on demonstration failed to give satisfaction and one of the same men failed badly in the management of a farm under the Court of Wards. But the majority have done good work, and with increasing numbers of trained men available from the college, it will be possible to return to the Land Record Department some men who appear to have no real aptitude for agriculture and to have been attracted to this Department by the higher pay offered.

At the close of the year a candidate was selected for a year's instruction in botany at Pusa; on completion of this course he will be appointed assistant to Economic Botanist and will be employed as assistant lecturer and demonstrator at the college. An assistant is also now under training in entomology at Pusa and will lecture in that subject at the college on completion of the course. A suitable man to train as First Assistant to the Agricultural Chemist is still wanted.

Financial.

3. The budgetted expenditure of the Department was Rs. 3,33,587. This was subsequently reduced under the orders of the Local Administration to Rs. 2,54,110, but the actual expenditure exceeded this amounting to Rs. 2,75,896.

PART II.—AGRICULTURAL EDUCATION.

The Agricultural College.

4. The conversion of the agricultural school into a college for which arrangements had been made in the previous year took effect in the year under report. The results fell short of what may be expected in future, because the second and third year students who had joined the school before its expansion had not the advantage of being grounded in their subjects (with the exception of chemistry), by the highly trained staff now available. Neither the staff nor the laboratory arrangements are even yet complete, and during the greater part of the year there was no special lecturer on botany. To complete the staff highly qualified native assistants are required for the Agricultural Chemist and the Economic Botanist, and a second assistant lecturer in agriculture who would also assist in instruction in survey. The classes are now becoming too large to be properly taught practical subjects by an unassisted lecturer. Since the close of the year the chemical laboratory has been improved and sanction has been obtained to the plans and estimate for the new laboratory building which is to take the place of the existing makeshift arrangements. It will probably take two years more to get the building erected and the fittings installed. Progress has been made with the preparation of a playing field for the students and some minor improvements have been effected in the hostel. The syllabus was altered in accordance with the recommendations of the Board of Agriculture. Only three students of the previous year remained to take the third-year course and three passed into the second-year class. There was considerable fluctuation in the numbers of the first-year students. The term opened with 28, of whom 6 left in the first month; 18 joined in August, but 17 left in that month and six later in the year; so that only 17 completed the course and presented themselves for examination. The efficiency of the first-year course is much affected by the publication of the result of the matriculation examination so late as July. Students who join punctually at the beginning of the agricultural year when the course can be most conveniently commenced are kept back by the matriculates of the year, who are not eligible for admission until the result of the examination is known and few of whom join until two or two-and-a-half months after the beginning of the term. Many of the students arrive without any very clear idea of the course of instruction given and leave when required to take part in the actual cultivation of the land. These youths get no benefit from the college themselves and now that applicants have become so numerous that there is not room for all, they keep out better men than themselves. There seems little chance of the difficulty caused by the date of announcement of matriculation results being removed, but it is intended in future to admit no student until the Principal has satisfied himself by actual test that the applicant is physically fit for practical work and has no objection to it.

The Principal reports that all the students appear to be more ready to devote themselves to book work than to the practice of the sciences they are taught: but he expects that this tendency will be corrected by the strongly marked practical character of the syllabus now prescribed. The result of the examination for the diploma was disappointing. Only one student secured a diploma and that in the second class: the other two failed, but one of them who showed promise in practical agriculture has been appointed a probationer and posted to the Nagpur Farm on condition that he attends the lectures in botany and chemistry and passes in these subjects at the next examination All the

three second-year students were passed into the third-year class and 15 of the 17 students of the first-year satisfied the examiners. Some of this batch promise well. The examinations were conducted by the expert staff of the Provincial Department except that in entomology, for which the imperial Entomologist, Mr. Maxwell Lefroy, kindly set the papers. In future arrangements will be made to secure that examiners unconnected with the college shall be associated in the examination of the third-year students for the diploma.

The Malguzari Class.

5. Fourteen passed through the course and were examined. The Principal found that the practical work did not receive enough attention and has made some alterations in this respect, which he hopes will give a better return for the instruction given in this class than has been the case hitherto. At the close of the year Mr. Paranjpe, the master in charge, made a little tour to visit some of the old boys. In a few cases he found that they had derived no practical benefit from their course on the farm and in a few he found them actually practising improved methods, but in the majority of cases the old pupil was ready enough to make use of the knowledge acquired, but hindered by the apathy or opposition of the head of the family. In such cases Mr. Paranjpe believes that his arguments were of some effect and that promises to give the boy the means of putting Mr. Paranjpe's precepts into practice will be kept. The results of the tour corroborate the opinion put forward by me in 1905 after I had visited half a dozen of the old boys, that the most important qualification for a boy selected to join the malguzari class is, that the management of the family land should be in the hands of an enterprising man. It is immaterial whether he belongs to one of the regular cultivating castes—in fact, really enterprising farmers are more often found amongst the literary castes whose superior intelligence renders them more capable of seeing the advantage of altering some of the old ways. Mr. Clouston contemplates taking a number of malguzars or their sons as pupils on the Labandih farm next year with the object of teaching them all about transplantation of rice. This proposal is made in response to a spontaneous demand and is certain to have an immediate effect on the agriculture of Chhattisgarh, and I am inclined to think that for the present the District Councils of that division might employ their money better in assisting the cultivators to obtain instruction in this particular operation than in giving scholarships tenable at the Nagpur Malguzari Class. For the rest of the Provinces the malguzari class will do useful work, provided suitable boys are selected, and the master in charge makes a tour every hot weather amongst the old boys. If District Officers would keep a list of the names and addresses of students of the class and visit their land when on tour it would have a good effect.

The Normal Classes.

6. Eighty-five students passed through the class and 82 passed the examination. In his report on the work of the college the Principal points out the weak point of this course, *viz.*, that too much is attempted in the short time allotted. Since the close of the year it has been decided to substitute a course of teaching in the subject known as 'Nature Study' for the elementary agriculture, botany and veterinary science now taught, and it is expected that the current year will be the last in which the Normal Classes will get their training at the college. The removal of these classes will obviate the difficulty which at present exists of accommodating in the hostel all the students of the three branches of the college. With the small classes attending the agricultural school there was ample room, but the experience of the past and the current year shows that in future there will not be more than enough room to accommodate the students of the college classes and the malguzari class.

Publications.

7. The monthly publication of the Agricultural Gazette has been continued: it is gradually increasing in usefulness and popularity and is a most useful means of conveying to cultivators the result of the experimental work carried out on the stations; of advertising seeds and implements and of advising cultivators on different points, about which they ask for information. The expert staff have contributed a number of interesting articles and the standard of the published matter has improved

considerably in the past two years. The number of subscribers as compared with that of last year is shown below :—

	English.	Hindi.	Marathi.	Total.
1906-07 ...	120	1,925	950	2,995
1907-08 ...	140	2,000	1,000	3,140

This shows an increase of 145 subscribers for the year. The Translator, Mr. Ramchandra Sadasheo Despande, has done his work very well.

New bulletins and leaflets were published on the following subjects :—

The introduction of improvements into Indian agriculture.

Sann-hemp, ambari and agave as fibre crops in the Central Provinces and Berar.

Instructions for the guidance of the managers of Government agricultural stations.

The wheats of the Central Provinces and Berar.

Sundry leaflets containing instructions for cultivation of particular crops and the preparation and use of manures.

PART III.—AGRICULTURAL ENQUIRY AND EXPERIMENT.

Experiment Stations.

8. The early cessation of the monsoon rendered the year peculiarly unfavourable for experiment, and it is only at Raipur where the rainfall was less deficient than elsewhere that reliable results were given by the majority of the series. An account of the work done will be found in the reports of the Deputy Directors and the Principal, Agricultural College, on the work of the experiment stations, and I will confine myself to a brief notice of some of the more striking results of the year's work.

Akola.

9. The farm buildings are not yet completed, but they are sufficiently far advanced to provide more comfortable accommodation for the staff than was available in the preceding year, and the engine-house, cattle-sheds and other out-houses were finished. Some progress was made with the embankment and drains necessary to secure the farm against damage from erosion and flooding, and the results indicate that it will be possible to protect the whole area satisfactorily.

Experimental cultivation at this station commenced during the year under report. The most important and promising work now in progress is the separate cultivation of the four distinct varieties of cotton now grown mixed under the name of jari or kati vilayati, the trials of the buri cotton, an American upland variety acclimatized in Bengal, and the cotton selection work. It was, I believe, Mr. Fletcher, late of the Bombay Department of Agriculture, who first drew attention to the varying quality of the lint produced by the cotton cultivated under the name of jari. Mr. Clouston having separated the four varieties, which are recognized as botanically distinct, is now growing each separately with the object of ascertaining whether it will pay cultivators better to grow a pure crop of one variety than the mixture now in favour. The Malvensis variety has the longest staple of the four. Its outturn and the proportion of lint to seed are somewhat smaller than in the case of one of the coarser varieties, but in the past year owing to the much higher value of the lint (almost equal to that of bani) the crop was more profitable than any other variety or mixture of varieties. The buri cotton did not succeed well on the plots of experimental Series E, but on non-experimental areas of this station and at Nagpur it gave fair results. In the current year it has shown a capacity for thriving under a continuous and long sustained rainfall, which has induced the hope that it might succeed in some parts of the Provinces where other varieties are killed or weakened by excessive rain.

The dry earth method of conserving cattle urine has given as satisfactory results here as on the other stations. This demonstration of the value of the urine saturated earth must be considered a most valuable piece of work. It provides a means of increasing by about 50 per cent the outturn of one acre for every pair of bullocks and that without expense and without interference with the fuel question. A demonstration of this method of preparing manure will be given at the Central Provinces and Berar Exhibition.

The breeding from selected cotton plants was continued.

10. During the year under report the Malguzar of Jora, in which village part of the station lies, objected to our use of the water in the Motibandh tank, on which the farm is dependent for its water-supply. Fortunately this objection was not made until the end of the season. Since then sanction has been received to the acquisition of the tank, and the station is now assured of an adequate water-supply.

Labandih.

It is worthy of note that the outturn of medium transplanted rice on matasi without irrigation in this droughty year exceeded that of biasi rice by 50 per cent. There is every reason to believe that Chhattisgarh might profitably follow the example of the Wainganga Valley on dry as well as irrigable lands. But for the present the department is confining itself to the encouragement of transplantation on irrigable land. Better field enbankments than are now usually found in Chhattisgarh are requisite to the safe cultivation of transplanted rice without irrigation. One of the most urgent needs of Chhattisgarh is the improvement of the fodder supply. The improvement of methods of cultivation is to a considerable extent dependent on the improvement of the cattle, most of which are so weak that careful cultivation is impossible. Some enquiry has been made into the value of the existing fuel and fodder reserves in the Raipur District, and so far as my information goes at present, I am inclined to doubt the possibility of rendering them really useful as sources of fodder supply. They are for the most part on bhata soil, which grows little but spear grass. It is quite possible to feed cattle on this grass, but unfortunately it is also suitable for thatching, and as village houses are always thatched in Chhattisgarh and the people must keep a dry roof over themselves, whereas their cattle can be just kept alive without stall feeding, most of the produce (all from some of the reserves) is used for thatching. It is very doubtful whether any of the better sorts of fodder grasses which are too soft to use for thatching will grow on the bhata. An experiment is to be made next year on the Nawagaon reserve to settle this point. I am convinced that if we wish to make effective provision for the better nourishment of cattle in this part of the Provinces, we must introduce some fodder plant which satisfies the following conditions :—

(*a*) It must be possible to sow and cultivate it cheaply and with the minimum of trouble.

(*b*) It must occupy the land at a time when no other crop would ordinarily be grown on it.

(*c*) It must improve the productive capacity of the soil.

Mr. Clouston has given attention to the subject and is now trying a wild lucerne. It seems possible that sann-hemp, which is extensively used for fodder in Southern India, may serve our purpose in rabi areas of the division, and this also will be tried next year.

With very careful arrangements for drainage, cotton and juar can be made to yield fairly good crops : but the cotton lint is of very inferior quality, and as it seems certain that cultivators will not grow the juar for fodder, and other grain crops are more profitable in Chhattisgarh, it was decided by my predecessor to abandon the trials of those crops. The double-cropping experiments have not given any useful results yet.

The difficulty of securing a reasonably good tilth prevents the realization of the advantage that would otherwise be secured by drilling the seed and irrigation. The results of series O P Q R were vitiated by neglect to standardize the soil of the plots and have been re-arranged. Series S is interesting, showing that a medium paddy can be successfully grown on matasi soil without irrigation or rain after the end of September, provided it be freely irrigated before that date. This experiment is specially interesting in connection with the fact that irrigation works can usually afford an abundant supply of water from July to September, while after that month the quantity of water available is often very

limited. This is the first year since the experiment was started that there has been no rain at Labandih in October. Series U requires connection with the measuring tank to give useful results.

A very successful start was made with the trial of good varieties of sugarcanes. This crop may become important in Chhattisgarh with the extension of flow irrigation, but it is still too early to determine whether the better sorts of sugarcane can be successfully grown on the black soils now allotted to this crop at Labandih.

Jute and groundnut, which are also being tried on this farm, are crops which may add largely to the profits of cultivators of irrigable land. On the subject of jute more will be found in the note on the Telinkheri farm.

Before giving over charge of the Department my predecessor remarked on the necessity for revising the experimental series, and at the close of the year the revision was effected on the lines indicated by him. All the rice experiments have been duplicated in late rice and some subjects, which experience shows to be unprofitable, have been dropped.

Powarkhera.

11. The most important work on this station is connected with rabi crops, and as the rabi season was extremely unfavourable, the results of experiment are not worth publishing. Although the kharif season was less unfavourable and fair outturns were obtained, the results of the experiment were to a great extent vitiated by the early cessation of the monsoon, which affected the outturn of the better developed and consequently later crops in a greater degree than those less carefully cultivated. During the year Mr. Evans completed a survey of the wheat varieties of the Provinces, and a large number of varieties were separately grown on this experiment station and at Nagpur, the principal object being to test them for rust resistance. The year was an exceptionally unfavourable one for the development of rust and, in spite of partially successful attempts to produce the fungus by over-irrigation at Nagpur, no conclusive results were obtained and the experiment must be continued until a season favourable to rust is encountered.

Mr. Evans has some interesting work on hand in connection with the effect on the commercial value of the grain of the mixed character of the wheat crop as now brought to market by cultivators. He is also engaged in an attempt to produce an early variety of tur, which shall be resistant to the wilt disease. The late varieties which are most resistant to this disease are unsuitable to the northern districts as they suffer from frost, while the early varieties are more susceptible to 'wilt'.

During the year the most suitable parts of the new area acquired in the year 1906-07 were carefully standardized, and a considerable area of good flat land was found sufficiently equal in quality to warrant the establishment of experimental series on it in the current year.

At the close of the year the experimental series here also were revised, the lines on which revision was to be effected having been indicated in general terms by my predecessor.

Nagpur.

12. The season was unfavourable to all crops except juar and sessamum and consequently the results of the experimental series are in some cases unreliable and are not shown in the report of the Principal, Agricultural College. A great deal of work was done to get the newly acquired area into better order, but it will be some years yet before the land will be fit to use as a seed farm. The farm buildings were completed, but it still remains to lay on water, without which the buildings are useless. Series D and M are interesting as showing the good effect of nitrogenous manures on cotton: but further experiment is required before it can be determined which manure is, from every point of view, the most profitable. The behaviour of tur in Series I and J is noticeable: there is a constant decrease in the outturns of this crop in J where it is sown mixed with juar, while in Series I, where cotton is the minor crop, this decrease is not observed. Series N corroborates the results of the Akola series designed to show the effect of

cattle-urine. A large number of varieties of wheat including some from Australia were grown to test rust-resistant qualities: in spite of over-irrigation, with the object of producing rust, no useful results were obtained as the year was eminently unfavourable to rust. Tur was tested for wilt: here also as at Powarkhera, the Sambalpur variety was found to be most resistant to the disease. The cultivation of selected cotton was continued on the lines described in last year's report. Jute was successfully grown on a small area.

Telinkheri.

13. The only experimental cultivation conducted on this farm was the cultivation of jute. This was most successful. It has been demonstrated that by sowing in the hot weather under irrigation a large profit may be made out of this crop, and it seems likely that it will be grown under some of the larger irrigation works on which water may be available in the hot weather. The cultivation requires considerable care and attention until the beginning of the rains, but if the plants have attained a few inches in height by that date, the crop may be left to itself and will give no more trouble till ready for cutting in the middle of August, when there is still time to put in a crop of transplanted rice.

PART IV.—DEMONSTRATION.

Transplantation of rice and irrigation of wheat in Chhattisgarh.

14. During the year this most important section of the work of the Department made a long stride forward in the Chhattisgarh country under the direction of Mr. Clouston, ably seconded by Mr. Tundilall Powar, the Superintendent of the Labandih Station. The objects were to demonstrate the advantages of transplantation of rice and of irrigation of wheat. The former subject had not been previously dealt with in demonstration and, although wheat had been cultivated as a second crop after rice with irrigation under the direction of this Department, the Irrigation Department and District Officers, the crops obtained had been so poor as to offer no encouragement to cultivators. The scheme of the past year was undertaken in consultation with Mr. Harriott, Superintending Engineer, Irrigation. The Irrigation Department have of course a strong interest in the success of the work since water will not be largely used until late rice is grown with transplantation and rabi is irrigated.

The method of demonstration adopted and the results obtained are fully described in an article contributed by Mr. Clouston to the Indian Journal of Agriculture, but this report will not be complete without a brief account of the work. Three agricultural assistants under the immediate orders of the Superintendent, Labandih Station, were located at two of the Irrigation Department tanks, Kurud and Khola, and at Kolar where there is a private tank. These men supervised the cultivation of transplanted rice on demonstration plots of about 5 acres at each place as well as on an area of about 25 acres in all in which malguzars and tenants of the village were induced to transplant. A careful comparison of the outturns of the transplanted fields and of exactly similar neighbouring biasi fields was made with the result that cultivators were convinced of the enormous increase in outturn coupled with saving in seed and increased net profit yielded by transplantation. The full effect of this demonstration became apparent at the end of the year when it was found possible to arrange for transplantation (under supervision of agricultural assistants with a trained ploughman in each village) on 300 acres of land in four villages under the Public Works Department tank at Khola and in 200 acres under several private tanks in Kolar and three neighbouring villages. At Jugeshwar, a village under the Kurud tank, the preliminary arrangements for transplantation on 300 acres had been completed, when an ill-disposed servant of the malguzar persuaded cultivators that it would not be to their advantage to transplant, because transplantation would result in the imposition of an increased assessment. This defection has been more than made good by the consent of cultivators to transplant large areas under supervision of agricultural assistants in Arang and four neighbouring villages—Labandih and surrounding villages, Balodgahan (near Dhamtari) and two neighbouring villages, and at Chandkuri near Drug, irrigable from the Public Works Department tank at Khapri. The current year's transplantation is not yet quite completed, but it is expected that the total area put under transplanted rice in these six groups of villages will exceed 1,000 acres. In addition the Deputy Director of Agriculture has provided malguzars in several other villages with

trained ploughmen, who will supervise the transplantation of considerable areas. An encouraging feature is that in the current year a considerable number of cultivators from the neighbourhood of Labandih, in whose villages the Department is not operating, have been asking for rice seedlings. There are certain difficulties to be met before this improved method of cultivation will be generally adopted, but none of them presents insuperable obstacles, and continued action on these lines will certainly result in adding enormously to the profits of rice cultivation in Chhattisgarh. The scope of operations is at present limited by the scarcity of trained agricultural assistants, and the Deputy Director of Agriculture has therefore commenced training youths from the Dhamtari Mission and expects to train in this particular operation a number of ploughmen and some malguzars and their sons next season. The accommodation at Labandih has been strained this year to provide quarters for these pupils and it may be necessary to apply for sanction to extend the buildings to furnish accommodation for the increased numbers expected next year.

Following on the transplantation demonstrations of the past year, the Deputy Director of Agriculture arranged for the irrigation of 400 acres each of wheat at the Kurud and Khola tank centres. The malguzar of Kolar also irrigated about 20 acres of wheat (he had not water for more). The crops obtained both of wheat sown as a second crop after early rice and as a single crop were much superior to those reaped on unirrigated lands in the neighbourhood, and ranged from 470 lbs. to 850 lbs. per acre for the second crop and from 520 lbs. to 1,030 lbs. per acre for the single crop wheat. Extensive preparations are being made for carrying on this branch of the work in the current year also, and advantage has been taken of the presence of the agricultural assistants in the villages to introduce groundnut and a good variety of sugarcane on small areas.

The only other cultivation demonstration undertaken was in Damoh where juar, cotton and wheat were grown on an area of about 11 acres close to Damoh town. The intention was to demonstrate the advantage of sowing juar and cotton in lines and of green soiling with sann-hemp for wheat. The value of the demonstration was diminished by manuring the kharif crop heavily and by irrigating the wheat. Any advantage derived from the method of sowing and the green soiling was no doubt ascribed by visitors to the manuring and the watering. The use of copper sulphate as a fungicide and the working of a winnower were demonstrated by agricultural assistants who were sent on tour for the purpose during the slack season. The value of the fungicide is generally recognized in the juar country and is used by a good many cultivators. It is reported that it is not always possible to obtain a good quality of the drug in local bazars. A number of important fairs were attended by the Superintendent of the nearest experiment station or by the Deputy Director of Agriculture of the circle, and lectures were delivered on agricultural topics likely to interest the people of the district; a small exhibit of seeds of good varieties and of implements was also shown. The lectures were based on articles in the Indian Journal of Agriculture and in the Agricultural Gazette and were appropriate to the agriculture of the neighbourhood. The subjects dealt with included:—improvement of cattle, conservation of cattle-dung and urine, nitrate of soda as a fertilizer for cotton, copper sulphate as a fungicide, cotton seed farms, their aims and advantages likely to accrue from them, sugarcane cultivation and the diseases of cane, transplantation of paddy and the use of certain machines. It is considered that this is an effective means of getting into touch with large bodies of cultivators and much attention will be paid to the subject in future.

An agricultural assistant was sent to the United Provinces to learn the Hadi method of sugar manufacture, and it is proposed to demonstrate this at the Central Provinces and Berar Exhibition.

Cotton seed farms.

15. The object with which these farms were started in 1905 was to provide a supply of superior seed by means of private agency. It was recognized that any improvement resulting from the use of specially good seed would be permanent only if based on self-interest, that is, if the cultivation of cotton in such a manner as to produce specially good seed could be made to pay better than cultivation for lint in the ordinary way, and if cultivators found that they gathered a more profitable crop from this seed

than from that produced by the usual methods of cultivation. It was also considered impossible and unwise for Government to enter the seed market on a scale large enough to materially affect the produce of the country : impossible because the quantity of seed required would be so large and unwise because Government competition would be likely to kill private enterprise. It was expected that the methods to be followed in the cultivation of these farms would result in producing seed of better germinating power and capable of producing a more prolific crop than the ordinary seed, but as it was expected that the crop would be smaller the farms clearly would not pay unless the seed fetched a much higher price and this could not be expected until the seed had proved its superiority. It was therefore decided that in order to induce a few farmers to give the scheme a trial, Government should guarantee them against loss. The year under report was the third since the establishment of the farms. There were three farms on two of which Jari is grown and on the third which lies in the Bani country, Bani is produced. The farms were sown with seed produced on them in the previous year and the produce of the second and third pickings was purchased by the Department at rates Rs. 20 above the market rate per khandi of seed cotton This bonus was paid in pursuance of the undertaking to guarantee against loss. It had originally been intended to determine by means of a panchayat whether the profits were less than they would have been under the usual methods of cultivation, but it was found that this did not commend itself to cultivators as practical. The result of the year's work was that the department secured 12,388 pounds of seed at a cost of Rs. 1,079 This expenditure was met from an allotment of Rs. 7,000 made by the Inspector-General of Agriculture from the grant received from the British Cotton Growing Association. In addition to this 1,200 pounds of the seed of the second and third pickings were retained by the producers. The seed obtained was sold at the ordinary bazar rate. No special steps were taken to ascertain what value cultivators placed on it, but from the fact that the owners of two of the farms wished to supply their own tenants with large quantities, it may be inferred that it is considered better than that obtainable in the local bazars. The experience on a small plot of 5 acres managed on the same lines by the Wardha Court of Wards seems to indicate that the seed produced has a value from 50 per cent to 100 per cent higher than ordinary hand ginned seed and that there is a likely to be a considerable demand for it. The cost to the Department of the seed obtained from the seed farms falls at about Rs. 50 per khandi as against Rs. 60 and Rs. 80 per khandi fetched by the Court of Wards' seed. So this method of obtaining a supply of good seed is not uneconomical. For want of trained staff the method of selection of seed now followed on these seed farms, if indeed it merits the name of selection at all, is of the roughest and it is probable that the greater value of the seed is based on its high germination percentage only. When the selection work now going on at Nagpur and Akola Experiment stations has had time to bear fruit and when it has been determined which of the Jari varieties is the most profitable the seed farms will be furnished with seed which will have a special value apart from its germinating capacity and the farms will become most valuable agents in the improvement of the cotton of this part of India. The ultimate object aimed at is the establishment of a number of such farms independent of the Department, but receiving any assistance that may be required in the provision of seed, trained staff or advice. At the end of the year arrangements were made by Mr. Clouston to increase the number of farms by five, so that there are now eight in all. I hope it may be possible this year to make another step in advance and free one at least of the farms from dependence on Government, thus ascertaining what price the seed will fetch in the market and whether the returns compensate the farmer for the extra expense and trouble of cultivation.

PART V.—SCIENTIFIC ENQUIRIES AND RESEARCH.

Agricultural Chemist.

16. *Analytical and research work.*—During the year 25 samples were received from the experimental farms for analysis. These consisted of substances to be used as manures, both natural and artificial, none of which showed any marked deficiency in composition, in fact some of the potash manures were of very high quality.

Another line of work has been a preliminary investigation into the composition of a number of samples of Central Provinces wheats. This is being continued in conjunction with Mr. Evans, Deputy Director of Agriculture, Northern Circle, and although the results are too technical to be of general interest at present it is hoped that practical good will ensue from consideration of the requirements of the wheat export trade.

Various analysis of soils from the Central Provinces and Berar have been and are being carried out with a view to collecting data to be used at the forthcoming exhibition.

Analytical work has also been performed for various other Departments including such questions as the loss of weight on the drying of wood, the value of coal found in the Nagpur District and the occurrence of fertilizing earth in Buldana.

Tours.—The Agricultural Chemist went on tour three times during the year. In January he visited the Raipur Farm taking such apparatus as would enable him to determine the value of sugarcanes in the field.

A great variation in their composition was found and those of high sugar content were selected for replanting. The ultimate success of this line of work is not very certain as it has been tried in various places before without much success; but it was considered advisable to try it. Through a continuous selection of cane for seed by chemical means it is hoped to establish a race of high sugar-yielding plants.

In February Mr. Plymen attended the Board of Agriculture Meeting at Pusa and formed one of the Committee for arranging a scheme of instruction in Provincial Colleges.

During April he went into the Northern Districts including Damoh, Saugor, Hoshangabad, &c., with a view to collecting information concerning grain measures. A report recommending the introduction of certain measures has since been forwarded to the Local Administration.

Other work.—A great deal of time was spent in drawing up plans for our new laboratories. These were supplied to the Public Works Department in very full detail with drawings of internal fittings and arrangement of drains, gas and water-supply, &c., for the chemical, veterinary and botanical sections as no botanist had then been appointed to the Central Provinces. The plans have since been discussed with the officers concerned.

Economic Botanist.

17. Mr. R. J. D. Graham, M. A., B. SC., took over charge of his office on 14th February 1908. He has thus been in charge for only four months of the year under report.

Scientific work.

Juars.—A survey of the juars of the Provinces has been undertaken. A large number have been received from all districts and the work of classification has been begun. Seed of each variety has been sown on the Nagpur Farm for the purpose of studying variations and improving the best varieties.

Rices.—Work on the same lines has been undertaken on the Central Provinces rices. These have been collected in order to be classified and are now being grown on Telinkheri and Nagpur Farms with a view to selection and improvement.

Sunn Hemp.—Samples of seeds have been received from several districts. These are being grown at Telinkheri Farm, the object being to determine how many varieties there are. From the study of the seed it seems probable that there are at least two varieties.

Cotton.—The varieties of cotton grown at Pusa last year have been resown at Nagpur. The types will be useful for demonstrating to students and will afford material for studying the vexed question of the fertilization of the cotton plant.

Herbanium.—A collection of the more common farm weeds is being made. This collection should prove useful for reference. The amount of time such work requires is great and the collection can only slowly be completed.

Tours.—In February after taking over charge at Pusa the meetings of the Board of Agriculture were attended. On the return journey from Pusa, Raipur Farm was visited. In March a tour was made to Poona where the College and various gardens were visited. Professor Gammie very kindly gave much useful information with regard to the work on rice and juar. The collection of cotton was seen.

In April the Experimental Farms at Akola and Hoshangabad were visited. The garden at Amraoti was visited in passing and a report has been submitted to the Deputy Commissioner.

Other work.—From April 24th Mr. Graham was in charge of the office of the Superintendent of Maharaj Bagh and Telinkheri Gardens. This work necessarily requires a considerable amount of time. No attempt was made to introduce any changes, the work simply being carried on until Mr. Leslie returned.

Botanical Garden.—The land between the Victoria Technical Institute and Hostel has been set aside for a Botanical garden. The land has been levelled and ploughed. It is hoped to gather there a collection of the plants illustrating the more important natural orders.

18. Mr. Evans, Deputy Director of Agriculture, Northern Circle, conducted an enquiry into the potato crop and since the close of the year has published an interesting bulletin on the subject, disclosing the existence of a very serious pest, an attempt to deal with which will be made in the current year.

Entomological Assistant.

19. The Entomological Assistant was on leave for 9 weeks during the year. He studied the following pests in particular:—

Cotton boll worms, wheat stem-borer and white-ants, sugarcane stem-borer, linseed pod borer and a grasshopper which was attacking linseed in the Nagpur country, and flies which were becoming a nuisance at the poudrette pits of the Akola Farm.

Monthly reports of his work are sent to the Imperial Entomologist at Pusa, and in case of the occurrence of any pest on a large scale, the Imperial Entomologist is informed. A good deal has been accomplished in the way of identifying pests and working out their life history, but the practical side of the work is still in the experimental stage.

PART VI.—MUSEUMS.

The Nagpur Museum.

20. The rearrangement of the exhibits which was begun in 1906-07 was continued during the year under report Mr. Basant Ram, the Archæological Assistant, whose services have been lent from the Lahore Museum, has completed the setting up of the exhibits of archæological interest, and they are now shown to the best advantage. He now has the arts and industries room in hand: when certain show cases, now under construction, are completed and the necessary descriptive labels affixed, everything possible will have been done to make these exhibits interesting and instructive.

A Taxidermist was employed during the greater part of the year and a considerable number of birds including a good collection contributed by Mr. Sly from the Melghat has been set up. The completion of this room also awaits the construction of glazed cases. But so little response has been received to the appeal for specimens issued by my predecessor that the prospects of filling the cases appears somewhat remote. Money is available and it is hoped to complete

the fittings of the whole museum in the current year. The library has been transferred to the Victoria Technical Institute Library and well arranged by Mr. Allan, Principal, Agricultural College, who is Secretary to the Society of Agriculture and Industries in the Central Provinces. Besides his work in the Museum, the Archæological Assistant made two tours to examine certain remains in Damoh and Raipur. His work has been very satisfactory. Mr. Clouston, who is Curator of the Museum, found on taking charge that the staff were in the habit of annoying visitors in various ways, their attention sometimes extending to demands for *backshish*. This has now been stopped and the cessation of annoyance is reflected in the increase in the numbers of visitors from 123,859 to 176,640.

Raipur Museum.

21. The Raipur Museum received little attention: none of the sum of Rs. 940 provided for fittings and exhibits was spent.

Raipur Weaving School.

22. A Serampore weaver was employed for 6 months to demonstrate the working of the Serampore loom. The school has supplied a few trained boys to cloth and carpet weaving workshops of some of the Rajas of the Feudatory States, but has not yet resulted in the adoption of a fly-shuttle loom by the weaver classes of Chhattisgarh. I believe that this is partly due to the fact that a really suitable pattern of loom has not yet been seen in the Central Provinces. It is hoped that the forthcoming weaving competition at the Central Provinces and Berar Exhibition may disclose some pattern of loom meeting all requirements: in that event, an attempt will be made to put more life into this school.

PART VII.—GENERAL.

Cattle Breeding Farms.

23. The annual return showing the state of these two establishments and the work done are included in those submitted with the Veterinary Report, but as the farms are for the present under the management of the Agricultural Department, some reference may be made to the subject. At Telinkheri the Gaolao herd remained in good health till the end of January 1908. In the 1st week of February, there was an outbreak of foot-and-mouth disease in the heifer shed, in all 7 heifers were attacked. They were segregated and carefully attended to. All the affected animals recovered in a fortnight.

The increase in the number of animals during the year is shown in the statement below:—

	Cows.	Bulls and male calves.	Heifers and female calves.	Total.
1st July 1907 ...	59	56	38	153
30th June 1908 ...	65	59	52	176

There were four deaths and forty births during the year under report. This is equivalent to a birth-rate of 67·7 per cent for a herd of 59 cows and a loss of 2·07 per cent from death in the herd as a whole.

Seven bulls were sent out for breeding purposes, four more were castrated on account of their not being true to type. Six heifers were sold for the same reason: and one bull and one cow, which were suffering from the dislocation of bones resulting from accidents while grazing, had to be sent to the Gow Raksha.

The old bull which had been with the herd from the time it was first established was sold so as to prevent in-and-in breeding.

One of the best of the young bulls has been selected to take his place.

The whole herd is inspected twice a year by the Director and Deputy Director of Agriculture and the Superintendent of the Civil Veterinary Department and animals that are found to be undesirable for breeding purposes are ordered to be castrated or sold.

There was a mild and quickly suppressed outbreak of foot-and-mouth disease amongst the Malwi herd at Powarkhera. This herd continues in an unsatisfactory condition owing to the difficulty of procuring good cows and a good bull in the Native States where these cattle are bred.

The additions to the herd during the year were as follows:—

Purchases	...	...	6
Births	...	...	14

Seventeen animals were cast, and 3 died.

Three bulls were sent out for breeding.

This is the best breed in the Provinces for work in the heavy soil of the Nerbudda valley and the black soil of the Satpura Districts, and is recognized as such by cultivators. Since the close of the year the herd was carefully examined by the late Mr. Jethiji, Superintendent, Civil Veterinary Department, in company with Mr. Evans, Deputy Director of Agriculture, Northern Circle, and myself and nearly half the cows were classed as not of the best type. It is necessary to make some special arrangements to purchase a first rate bull and about 20 cows. Colonel Crofts, Inspector-General of Civil Hospitals, who knows Gwalior well has kindly undertaken a correspondence on the subject with the Sirsubah of Malwa from which I hope for good results. At the end of the year 18 bulls had been issued and were in the hands of private breeders. The results have not been encouraging so far. Too often in the absence of their master the servants in charge neglect the bull and he becomes weak and comparatively useless if not actually ill. The amendment of the terms on which bulls are issued is under consideration.

Actions taken on the recommendations of the Board of Agriculture.

24. A meeting of the Board of Agriculture was held in February 1907 when Resolutions were passed on the following subjects amongst others, affecting the Central Provinces and Berar:—

(1) The cultivation of sugarcane. On the advice of the Board the Department has dropped for the present the larger plans of experimental work in this crop, which have been proposed, on the ground that it is advisable to confine large schemes in connection with any crop to the Provinces where the crop is of commercial importance. For the present therefore the Department is confining itself to (*a*) testing new varieties, (*b*) improvement by chemical selection and (*c*) study of methods of preventing the ravages of pests and diseases.

(2) The unification of methods of analysis to be employed in the chemical laboratories of the Agricultural Departments in India. Mr. Plymen was a member of the Sub-Committee which dealt with this subject. It was decided to prescribe methods to be followed in analysis of certain substances and those methods have been adopted.

(3) The analysis of artificial fertilizers for private individuals. The object aimed at, *viz.*, the protection from swindlers of the few cultivators who now use artificial manures has been attained by selling to such people from the Departmental stock which is tested by the Agricultural chemist.

(4) The best method of insuring that cultivators shall receive the full value of any specially good varieties of cotton introduced by the Department.

Arrangements were made with the Manager of the Empress Mills to take over at full market value the small quantity of special varieties of cotton available.

At the Conference held in the year under report the Central Provinces and Berar were represented by the Director (Mr. Sly), the Deputy Directors of Agriculture (Messrs. Clouston and Evans) and the Agricultural Chemist (Mr. Plymen). The recommendations of this Meeting of the Board concern the current year and will be referred to in the report due next year.

Collaboration with the Irrigation Department.

25. It has already been stated that the demonstrations of transplantation of rice and irrigation of wheat in Chhattisgarh was arranged in consultation with the Irrigation Department.

Distribution of Implements from the Nagpur Depôt.

26. Despite the fact that this has been a year of poor crops and of small farming profits, there has been a good demand for the agricultural machinery supplied by the depôt.

Ransome's Turnwrest Plough and Harder's American Winnower have sold well as usual. As an eradicator of *kans* and *kunda* the Turnwrest Plough is hard to beat. These ploughs being rather heavy in draught are in greatest demand in Berar where there are good bullocks available.

The all-iron winnower now being made at the Rasulia Workshop, Hoshangabad, is a strong durable machine, but some small defects in the fittings have yet to be provided against.

The Cawnpore Chain Pump which is now being made on the Raipur Farm by the farm smith is a cheap and useful form of water-lift. It can be worked by hand or bullock gear and is more economical than the bullock mote for depths not exceeding 20 feet. It was the sole lift used on the Raipur Farm for irrigating sugarcane, jute and wheat this year. The demand for these pumps is likely to increase very much when they become better known among cultivators. The parts are simple and can be very easily repaired should they get out of order.

An oil engine and pump supplied by Massey & Co. have been set up at the Telinkheri well and was working for a couple of months at the end of the year. As worked at present, however, with ordinary kerosine, it is much less economical than the mote. As soon as it is required after the rains, it will be tried with liquid fuel which will reduce the cost of working by nearly one-half.

The American Manure Spreader was tried on the Akola Farm. On ploughed land it is too heavy for bullocks. The only purpose for which it may prove at all suitable will be for spreading poudrette which the ploughmen of the farm refuse to handle.

The steam engine supplied by Marshall & Co. tried on the same farm has worked well. It drives two gins with ease. In a day of 10 hours 1,250 pounds can be ginned by it without injuring the seed.

The winnower is coming more into favour every year and some of the other implements are beginning to arouse interest. The establishment of agencies for the sale of machines tested by the department and for the supply of spare parts to replace breakages is under consideration. This was recommended by the Board of Agriculture and enquiries now going on may show that the opening of such an agency in at least one district would not be premature. At the same time some provision would be made for repairs.

The statement below shows the distribution of implements from the depôt during the year :—

Names of implements.	Number supplied to—			Total.
	District and other Government Officers.	Private persons.	Demonstration and other Experimental Farms.	
Turnwrest plough	6	21	4	31
Fodder-cutter	5	4	2	11
Paragaon grinder	...	...	1	1
Broadcast seeders	...	2	...	2
Perfection sprayers	1	3	1	5
Brass bucket spray pumps	...	3	3	6
Reflector tubular lanterns	...	2	...	2
Safety mill lanterns	...	1	9	10
Corn shellers	...	18	3	21
American winnowers	5	16	1	22
Smalley cutter	...	...	1	1
Manure spreader	...	...	1	1
Mower	...	...	1	1
All-iron winnowers	2	5	1	8
Swedish ploughs	1	...	...	1
Colonist grinders	...	...	1	1
Lever cutter	...	1	...	1
Junior feed cutters	...	4	...	4
Segment planter	...	1	...	1
Thresher	...	1	...	1
Bullock gear	...	...	1	1
Chain pumps	6	12	1	19
Country ploughs	...	...	6	6
Bakhars	...	...	6	6
Sugarcane mill	...	1	...	1

Distribution of seed.

27. The experiment stations continued to distribute seed of good varieties to members of agricultural associations and others. Some useful crops have thus been brought to notice and are becoming popular; such are the Saoner juar which in good soil beats the local varieties of other parts of the provinces and has now obtained a foothold in most of the cotton and juar growing districts. The Nassik and Safeda paddies and Nagpur early tur: and it seems likely that some of the improved varieties of sugarcane distributed from the Labandih Farm for the first time last year may come into strong demand. The farms also meet a demand for seed of common varieties which has nothing to recommend it beyond the possession of greater germinating power and greater purity. By selling this seed the farms are extending their connection with cultivators and paving the way to the seed business which will arise hereafter when we have some scientifically selected seed to dispose of. When that time comes the seed produced on the farms will be reserved for supply to private seed farms, the establishment of which will become one of the most important duties of the department and the public demand will then be met from these farms.

Agricultural Associations.

28. Now that a Deputy Director of Agriculture has been appointed for the north of the Provinces it is possible to arrange that every meeting of the Associations shall be attended by an expert. This has two advantages, it ensures that subjects brought before the meetings are properly explained and it brings the members in contact with the expert staff and gives the latter an opportunity of cultivating friendly relations with cultivators of their charge and bringing their personal influence to bear. The Associations continued to assist in the introduction of new varieties of crops, of improved methods of conserving manure and of the use of artificial manures, greensoiling, &c. In time they will become a most useful part of the organization for introducing improvements. The existence of the Association in Raipur facilitated the arrangements which have been described above for the introduction of transplantation of rice. In all the cotton districts the wide diffusion of the knowledge of the value of pickling juar seed is partly due to these bodies. In Jubbulpore the distribution of groundnut seed to a member of the Association seems likely to lead to extensive cultivation of the crop in suitable areas of that district.

Tussar cultivation.

29. For the first six months of the year the Agricultural Assistant selected for this work was under training in the Tussar Farm at Chaibassa. It was hoped that he would have the benefit of instruction by Mr. N. G. Mukherji the sericultural expert of Bengal but that gentleman having unfortunately died, Mr. de Dombal who had been placed in charge of the farm at Chaibassa initiated the assistant in the art. In the course of the remaining six months the sanction of the Local Administration was obtained to the establishment of a Tussar farm near Arsoda in the Chanda district. The immediate object is to supply good seed to rearers of the worm. Wild cocoons are obtained from the forests through the forest department and the worms thus obtained are reared during the rains, the produce being distributed to rearers in the autumn. In addition to the local cocoons some were obtained from Chaibassa. The results of this work belong to the current year and will be reported next year. The Agricultural Assistant in charge appears interested in his work and will probably be able to produce a quantity of cocoons for distribution: experience will show whether this is sufficient to revive the industry. Another object of the farm is to discover whether it is possible to rear the worms year after year on the same area. Unless this can be done no great expansion of the industry can be looked for.

Notice of Services.

30. In bringing to a successful issue the demonstration of transplantation and wheat irrigation which was arranged in Chhattisgarh at the end of 1906-07, and in organizing the more extensive operation now in progress Mr. Clouston has rendered valuable service. The prestige which the department cannot fail to acquire from this piece of work must largely diminish for the future the difficulty of procuring the adoption of new methods in Chhattisgarh and is likely to affect favourably the work in other parts of the Provinces. Mr. Clouston has been admirably assisted by Mr. Tundilal Powar, B. A., Superintendent of the Labandih Farm, who has gained in a remarkable degree the confidence of the cultivators with whom he has come in contact. Mr. Plymen has been too much tied by the demands of the lecture-room to have time for much research, but in collaboration with other officers of the department he has several enquiries in progress which are likely to yield practical results of value. It is desirable that both he and the Economic Botanist should have opportunities for moving about the country and gaining at first hand a knowledge of the agriculture of the Central Provinces and Berar.

Mr. Evans has made a good start in the north of the Province and I confidently anticipate that a few years will see valuable additions to the agricultural practice of this part of the country. Of subordinate officials, Ramcharan Lall Dube, Overseer of the Raipur Farm, and Lall Muhammad, Agricultural Assisant, did particularly good work as assistants in charge of the transplantation demonstration.

B. P. STANDEN,

Director of Agriculture,

Central Provinces.

NAGPUR :
The September 1908.

Govt. Press, Nagpur :—No. 1304, D. of A.—21-9-08.—530.

DEPARTMENT OF AGRICULTURE

OF THE

CENTRAL PROVINCES

FOR THE YEAR

1908-09

Agents for the sale of Books published by the Central Provinces Administration.

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No. 523—XIII-18-12.

CENTRAL PROVINCES ADMINISTRATION.

Agriculture Department.

Nagpur, the 8th November 1909.

READ—

Report on the Department of Agriculture, Central Provinces, for the year ending the 30th June 1909.

READ ALSO—

Report on the Agricultural Stations for the same period and letter No. 3720, dated the 27th September 1909, from the Director of Agriculture, forwarding the same.

Report on the management of the Provincial and District Gardens in the Central Provinces for the same period and letter No. 3946, dated the 21st October 1909, from the Director of Agriculture, forwarding the same.

RESOLUTION.

The present report is the fourth issued since the constitution of the Department under a separate Director. The year covered by it is the first during the whole of which the superior staff of the Department was at its full sanctioned strength, and it is now possible to forecast with greater accuracy than before the lines along which the usefulness of the Department must develope. But while much good work has been done during the year, and the staff are getting into close touch with the cultivators of all classes, the Chief Commissioner observes that the useful work of demonstration is still somewhat retarded and confined by lack of the necessary subordinate staff. The subordinate service is still below its sanctioned strength, but the developement of the Agricultural College, which is proceeding apace, should remove this defect in the near future.

2. Mr. Phillips has read with great pleasure the account given of the work of the College. Apart from the actual results of examinations, the test of practical field work which has been applied to all candidates, and the inculcation of the principles of an out-door life, should lead to the developement of the type of hardy demonstrator which is so needed by the Department.

3. The reports on the malguzari class have been disappointing from the beginning of its history, and each succeeding year seems to show less encouraging results. While there can be no doubt that the training of the sons of malguzars and other agriculturists in enlightened methods of agriculture should be a principal object in any scheme of Government agricultural instruction, it is clear that little success can be expected while the training is confined to a class at Nagpur. The demand for instruction is not yet sufficiently keen to induce parents to send their sons to a distant town for a long time. So long as the only available teachers were located at Nagpur nothing more could be done. This is no longer the case, and substitution of short courses in particular branches of agriculture in which particular students may be interested, at local centres, might, in Mr. Phillips' opinion, lead to greater success in awakening interest in technical instruction; the keener spirits will always be able to proceed to the College afterwards, and will reap fuller advantage from the College course. The Chief Commissioner will be glad to receive and consider any proposals the Director may see fit to advance on these lines; but he recognises that before

any new scheme is initiated, it will be necessary to observe the results of the experiment in local training started at Labhandih, as well as of the increased practical work exacted from the class at the College.

4. The experiments conducted during the year have been handicapped to a considerable extent by the unfavourable character of the rainfall except on the Labhandih Farm, while some of them were of such a nature that a series of tests covering several years will be necessary before definite results can be arrived at. This applies particularly to the experiments in the cultivation of wheat carried out at the Powarkhera Farm. Much useful observation work has been carried out, and the reports from the various stations show a good year's record. At the Akola Farm the experiments with cotton were continued, and the results showed the superiority of the imported "buri" variety over the ordinary "jari" even under the conditions of the year which was marked by exceptionally continuous rains; and even the long-staple "malvensis," the superiority of which was noted in the previous year, has apparently been found less profitable than the "buri". It is not yet certain how the outturn with "buri" would compare with that of the local varieties in more normal seasons. It appears to be at present free from the wilt disease, which has caused serious loss lately in the "jari" crop. At Labhandih some useful work has been done on sugarcane and in testing various methods of cultivating rice and other crops, but the most important work connected with this station has probably been that of demonstrating the transplantation of rice; among minor experiments the success of the wild lucerne has contributed a useful factor towards the solution of the problem of fodder in Chhattisgarh. The main experiments at Powarkhera have led to a somewhat negative result, but experiments in wheat must always take a considerable time before any positive conclusion can be reached. The successful experiments in jute at Nagpur and Telinkheri are of interest: it is, however, doubtful whether jute will take the place of food-crops on any considerable area in the immediate future.

An interesting feature in this year's report on the Agricultural Stations has been the financial success achieved by the Labhandih Farm. Only a very small part of the area of our farms is devoted to experiments, the remainder being utilized mainly for the growth of good varieties of crops for seed, and there is no reason why this latter area should not return a profit on the expenses of cultivation *plus* a reasonable share of cost of supervision. It is of course not the object of these farms to make money, but, if apart from the expenditure required for the prosecution of experiments, the cultivation is habitually carried out at a loss, it must be inferred either that the cultivation is inefficient or that the agency employed is too expensive and in either case the need of reform would be apparent. Mr. Phillips considers that in estimating the efficiency of the farm-staff great weight should be allowed in future to the financial results of the non-experimental cultivation and in order that the test of efficiency may be as complete and reliable as may be, he desires that a separate account may be made out at the end of the year for this non-experimental area of each farm. Some of the items on the expenditure side will have to be divided by estimate between the experimental or non-experimental areas, but the Chief Commissioner believes that a sufficiently accurate account can be made out to afford a valuable check on the work.

5. Research work has been carried on steadily throughout the year in the three departments of chemistry, botany, and entomology. Here, as in the case of the College, considerable difficulty has been experienced owing to the lack of accommodation, but the new laboratories are being put in hand at once, and the Chief Commissioner has been glad to recognise the steady progress achieved in spite of all obstacles.

6. In the work of demonstration this year a large part was taken by the Agricultural Section of the Nagpur Exhibition. The work of the Department was illustrated in such a way as to bring its value home to the cultivator: and while the more advanced agriculturist was catered for on the scientific side, the working of agricultural machinery afforded an object-lesson to all. Apart from

the Exhibition the most valuable work in demonstration has been in the transplantation of rice in Chhattisgarh. In this advantage has been taken of the advice and co-operation of the Irrigation Department; and eventually, with a more extensive staff, the Department will gradually multiply its demonstration centres in connection with the Government irrigation works so as to enable the cultivator to make the best use of the water. New machinery and new implements have been made known over a wider area, and the local shows and fairs have been utilized as centres for instruction. Mr. Phillips is glad, however, to note the Director's remarks in regard to the policy of the Department in recommending only such new machinery as has been proved to be an improvement on the old methods. Arrangements are being made in the current year for the thorough trial of the Hadi sugar-producing plant with the assistance of experienced operators from the United Provinces. The Administration will always be ready to assist the Department in the application of tests of this sort.

7. During this, the fourth year of the existence of the seed-farms, the Department continued the policy of purchasing seed at an enhanced rate to ensure profit to the proprietors. The seed thus purchased was sold at rates 50 per cent in advance of bazar rates, and it is believed that cultivators have now realized the value of the selected seed. It is hoped therefore that the growers will be able to dispense with this artificial assistance for the first time in the current year. It is intended to leave the seed-farmers to dispose of their seed direct for what they can get, receiving assistance from the Department only in the sale of special varieties such as "buri." The Chief Commissioner will watch the results of this experiment with much interest.

8. Winnowers, turnwrest ploughs, and corn-shellers still hold a prominent place among the machinery distributed by the Department, while the demand for chain pumps and to some extent for bullock gears has been marked. The Powarkhera Farm has achieved considerable success in popularising improved machinery during the year. The time, however, is fast approaching when it will be necessary for the work of supply to be taken over by private firms, once the particular types of implements and machinery have been tested and a demand for them created by the Department. The demand now existing is well worth the attention of owners of workshops, missionary and otherwise. In this, as in the case of the seed-farms, the object of the Department must be to create the demand and then to induce private enterprise to take advantage of the opening.

9. The cattle-breeding farms show no definite achievements during the year, and a radical change has been made in the method of distribution of the stud bulls produced, the bulls being sold outright instead of lent on terms which are rarely fulfilled. A start has also been made with the improvement of stock in Chhattisgarh, for which country the large Malwi and Gaolao cattle bred on the Government farms are unsuitable. The Chief Commissioner will observe with great interest the results of the experiments to be initiated with a view to the improvement of the local breed of that Division by selection and careful feeding as opposed to the intermixture of imported blood.

10. The District Gardens have continued to do well and the distribution of plants and trees has been carried on to an increased extent. Financially the results of the year in these gardens have not been good, but the necessity for heavy initial expenditure on five gardens newly taken over by the Department, combined with other fortuitous causes, have contributed to bring about an increase in working expenses which cannot be expected to last: the management and work of the gardens has been, if anything, above the average.

11. The attention of the public was particularly drawn to the work of the Department by the Exhibition, and the continued increase in the circulation of the "Agricultural Gazette" is an encouraging feature. Many of the issues of this publication are excellent, containing valuable information on important subjects in an easily comprehensible form: but the Chief Commissioner has observed a tendency to insert too frequently extracts from other publications which are not so useful. With the present strong staff it should always be possible to provide matter locally. The Chief Commissioner has read with great gratification the

remarks of the Director indicating the close relations between the two Deputy Directors and the cultivating classes and the admirable spirit which the Superintendent of the Raipur Farm has brought into his demonstration work. The practical success of the Department depends entirely on its power of getting into touch with the actual cultivators of the soil. This essential principle was very strongly insisted on by speakers at the meeting of the Board of Agriculture held in February at Nagpur, and the report shows that it is fully realized in the Central Provinces. The District Agricultural Associations will be of the greatest possible help in this direction provided that the right men are selected, and the Director's remarks show that this is now generally the case.

12. The results of the year's work are decidedly encouraging. The field of work is enormous, and for years to come the actual achievement will be comparatively small, but real and visible progress is being made, and no one who watched the daily crowds at the Agricultural Section of the Nagpur Exhibition, and listened to their interested and shrewd comments, could fail to recognise that they came in no spirit of idle curiosity. The sympathetic treatment of the ryots by the officers of the Department has no doubt greatly assisted the growth of an active interest in agricultural improvement; and Mr. Phillips sees no reason to doubt that many of the obstacles set up by ignorance and prejudice which confronted the Department in its infancy will shortly vanish from its path.

13. The thanks of the Administration are due to those officers of the Department whose efforts contributed largely to the success of the Exhibition among whom besides Mr. Hemingway himself may be mentioned Messrs. Clouston, Allan, Plymen, Graham and Hira Lal. The two Deputy Directors, Messrs. Clouston and Evans, have thoroughly identified themselves with their charges. The primitive character of the rice cultivation in Chhattisgarh, and the construction of irrigation works there, have afforded the former an opportunity of proving the value of the Department to the cultivators of which he has made the best possible use. Want of establishment and the more efficient existing type of cultivation have operated to delay results in the Northern Circle: but Mr. Evans is working on the right lines, and has his heart in his work; a combination which will give satisfactory results in due course. Mr. Allan has had an up-hill task with the farm in bad condition and troubles in the hostel: he has attacked his work with determination, and the Chief Commissioner confidently expects that the current year will show that the tone of the College is all it should be, while the farm already shows a marked improvement.

Messrs. Plymen and Graham have been handicapped in research work by want of assistants, but have found time for some valuable original work.

The Chief Commissioner desires to express his regret at the retirement on account of ill-health of the Assistant Director, Rao Bahadur R. S. Joshi, and to record his appreciation of the services of that officer to the agricultural community of these Provinces. Mr. Joshi spent the best years of his life in agricultural work in these Provinces, and by his well-known worth as a practical farmer did much to pave the way for the more ambitious schemes of the now enlarged Department.

ORDER.—Ordered, that a copy of this Resolution, together with the enclosures, be submitted to the Government of India in the Revenue and Agriculture Department; and that copies be forwarded to the Director of Agriculture and to all Commissioners and Deputy Commissioners, Central Provinces, for information and guidance; and that it be published in the Supplement to the *Central Provinces Gazette.*

A. E. NELSON,

Third Secretary to the Chief Commissioner,

Central Provinces.

Govt. Press, Nagpur :—No. 1637, Civil Sectt.—10-11-09—530.

No. 3719.

FROM

P. HEMINGWAY, ESQ., I. C. S.,

DIRECTOR OF AGRICULTURE,

Central Provinces,

TO

THE SECRETARY TO THE HON'BLE THE CHIEF COMMISSIONER, AGRICULTURE DEPARTMENT,

Central Provinces.

Nagpur, the 27th September 1909.

SIR,

I have the honour to submit, for the information and orders of the Hon'ble the Chief Commissioner, the Report on the working of the Department of Agriculture of the Central Provinces for the year 1908-09.

I have the honour to be,

Sir,

Your most obedient Servant,

P. HEMINGWAY,

Director of Agriculture,

Central Provinces.

Report on the working of the Department of Agriculture, Central Provinces, for the year 1908-1909.

PART I.—ADMINISTRATION.

Controlling Staff.

The post of Director was held by Mr. Standen, C. I. E., I. C. S., up till the 3rd November 1908, and by myself during the last eight months of the year. The superior expert staff, detailed in the last annual report, remained unchanged throughout the year. In March 1908, Rai Bahadur R. S. Joshi, was compelled by ill-health to retire from the service: he had held the post of Assistant Director since its creation, and in him the Department has lost a most zealous and hard-working officer.

Subordinate Staff.

2. During the year the staff of Agricultural Assistants was increased by six men. One assistant, who had been lent to the Kutki Estate in Wardha District, was recalled to join the staff in the cold weather, when the work in the Southern Circle was dislocated by the prosecution of two Overseers for complicity in the outrage upon Her late Majesty Queen Victoria's Statue in Nagpur: both were acquitted, and one returned to duty; the services of the second, a probationer, were dispensed with. Of the 10 posts in the 4 highest grades, only 4 were actually filled during the year and there are still 9 vacancies in the lower grades. The candidate under training in Entomology at Pusa died while on leave, and a student has recently been selected to take his place. One assistant was on Foreign Service during the year until May, 5 were employed as assistants to the expert staff, and the Arsoda tasar farm and Entomological work employ 2 more: the remainder are in charge of experimental stations or attached to those farms for experimental and demonstration work. Another year will elapse before the Nagpur Agricultural College can turn out sufficient men to fill all vacancies in the department: it will then be possible to return to the Land Record staff a few men who have no marked ability for practical work in agriculture.

Financial.

3. The budget allotment of the department for the year 1908-09 was Rs. 4,11,500: this however included a grant of Rs. 53,000 for expenditure in connection with the Nagpur Exhibition. The actual expenditure was Rs. 4,08,915: a balance of Rs. 2,585 lapsed at the close of the year; this represents savings on account of staff: the budget provided pay for more men than it was actually found possible to employ. The income from the farms increased very largely during the year: the income at Labandih now meets the expenditure.

PART II.—AGRICULTURAL EDUCATION.

The Agricultural College.

4. The College in Nagpur has made creditable progress during the year. The difficulties of staff and laboratory accommodation have not yet been completely surmounted: but a second assistant to the Agricultural Chemist has been engaged, and at the close of the year the student deputed to Pusa for training in botany returned to the staff; arrangements have also been made for a second Assistant Lecturer in agriculture. During the year under report the number of students in residence increased from 22 to 43, and until additional assistants were obtained the lecturing staff found the classes unwieldy, for laboratory work in particular: the additional demonstrators have, however, been found for the ensuing year. A site has been selected for the College laboratories, opposite to the Victoria Technical Institute, and their construction will be started at the end of the rains. The want of accommodation will be felt most acutely during the next two years; for in place of the numerically small third year class that has just left College, there will be large classes of second and first year students. The numbers that appeared for examination were third year 3, second year 14, and first year 26. Eight students who had been admitted in the 3 years removed themselves during the year: of these 7 left during the first year of their instruction. The Principal reports that the tendency to leave the College after a short experience of its work is decreasing: in the previous year 40 boys were admitted, but only 17 appeared for

examination. This improvement is no doubt due to the careful selection of boys applying for admission: Mr. Allan has taken great trouble in explaining to candidates the work and aims of the College; and he admits no boy unless he is personally satisfied, so far as is possible, that the boy is not afraid of hard work in the field. This selection before admission has resulted in distinct improvement in practical farm work: the present first year boys are in this respect far more promising than were their predecessors. The Principal remarks in his report upon the scarcity of students who are natives of these Provinces. I do not consider this a serious defect at the present time: when a new College is opened here the class that applies first for admission in large numbers represents the sons of professional men who have no connection with field work: no educational fees are charged, and the educated classes look upon the College solely as a stepping stone to Government service, of any kind: the agricultural classes are still but poorly equipped with qualifications for attending the course of instruction. This matter will right itself in time, provided that the test of practical work is enforced: but possibly improvement may be stimulated in the current year, by the introduction of fees; this is now under consideration: if the course is not free parents will be less prone to look upon it as a speculative method of obtaining employment in other departments; but it will probably be advisable to give the Director fairly wide powers in remitting fees in the case of promising sons of tenants and poor malguzars. The results of the examinations were satisfactory; of the three third year students all passed, and one obtained a first class diploma. The second and first years' are promising well: practical work has shown great improvement.

The dastardly outrage on Her late Majesty's Statue in the Maharajbagh cast a stigma upon the College and Hostel in November which may possibly have prejudiced the local educated classes against the College. The facts of that case have long been public property, and I need not repeat them at any length. A College student is now serving a term of imprisonment for committing the offence: the Superintendent of the Hostel, Mr. N. S. Paranjpe, and two Farm Overseers who had temporary quarters in the Hostel, were sent up for trial with that student, but were discharged or acquitted. At the time of that enquiry it appeared only too probable that this outrage was the result of seditious teaching inside the Hostel, and the taint of suspicion fell at once on all its residents. The Police proceedings at the Hostel were attended by Messrs. Allan, Plymen and Graham, besides myself: and though it seemed clear that the outrage was committed from the Hostel, and was possibly actually planned inside that building, it is equally certain that seditious literature and ideas were indulged in by but a small clique. The general morale of the College is now excellent. But in order to ensure that students are completely removed from seditious influences a few small changes have been made in the Hostel: an extra mess has been provided, so that all castes may take their meals inside the buildings; in-door latrines for night use have been built, so that the doors may be effectively closed at night; and a separate allowance allotted to the post of Hostel Superintendent, so that the member of the staff whose moral influence appears most marked, may be put in charge. In this connection I attach great importance to the College playgrounds: Mr.. Allan is gradually improving the cricket field and tennis courts, and teaches the students to understand that out-door exercises qualify them for actual work. Close association with the Principal and other officers outside the lecture room is highly desirable in the case of students who in after-life will be required to demonstrate and work with tenants of every caste and creed in the Provinces. The small reading-room inside the Hostel is supplied with good newspapers and periodicals.

Malguzari Class.

5. Twelve boys only passed through this class during the year. The Principal reports that the class was not so successful as in former years. It is exceedingly difficult to get good students: of a dozen entries only 3 or 4 are boys of much attainment and knowledge; the rest are but poorly educated and are both slow to learn and unable to practice what they have picked up when they return to their own farms. In the year under report the work of this class was dislocated by the removal of Mr. Paranjpe, who was Malguzari Master as well as Hostel Superintendent.

To replace Mr. Paranjpe, the services of Mr. Prem Narayen, Naib-Tahsildar in Saugor, were obtained: he is a younger man, and an old student in the Agricultural School. During the year the work of this class was altered: boys are now given plots to cultivate and have a small garden also: formerly they merely watched demonstration work. Examination results were poor.

The question of curtailing this malguzari class is under consideration: in its place a short training on the farms in the tracts from which boys come may possibly be tried. Mr. Clouston has already started a small scheme for giving local boys lessons in transplanting and irrigating rice at the Labandih Farm, and this may possibly be extended in the future to the Akola and Powarkhera Farms, the Nagpur Class remaining for the Nagpur country only. This would entail some further expenditure on accommodation; and the scheme would not work unless the Superintendent of the Farm had time to train the boys personally: if left to probationary Overseers or ploughmen, they would only waste their time. But I am of opinion that a short course from July to November on a local farm might lead to useful results, particularly if it were also possible for a malguzar or his son to return later at the wheat harvest, and learn seed selection, in the wheat country, or cane cultivation in the irrigated areas.

Normal Classes.

6. During the first part of the year 23 Normal School Masters were trained at the College: the classes were then discontinued. A course of "Nature study" is being substituted at the Normal Colleges at Nagpur and Jubbulpore.

Publications.

7. The circulation of the monthly Agricultural Gazette is increasing rapidly: the figures are quoted below:—

	English.	Hindi.	Marathi.	Total.
1907-08	140	2,000	1,000	3,140
1908-09	201	3,120	1,332	4,653

A query and answer column has been started, and in addition to the articles contributed by the expert staff, notes are generally given on veterinary subjects. The Translator continues to work well, and the translations are now checked by the Superintendents of farms in order to ensure that the language is simple enough to be understood by the average tenant. Occasionally articles are illustrated. Simplicity of language is a necessity: it is trusted that schoolmasters may occasionally read out articles which appear of local interest to their boys.

New bulletins and leaflets were published on the following subjects:—

The advantages and methods of using Ransome's turnwrest plough.

Cultivation of buri cotton and groundnut.

Treatment of the more deadly forms of cattle disease.

In the past complaints have occasionally been heard that tenants do not understand how to sow and cultivate varieties of crops supplied to them either direct or through District Agricultural Associations. To ensure that selected seed obtains fair treatment, printed instructions are now being issued with each parcel of seed in the Northern Circle.

PART III.—AGRICULTURAL ENQUIRY AND EXPERIMENT.

Experimental Stations.

8. On the whole the monsoon was more favourable than in the previous year, but the rainfall was too heavy and continuous to give quite satisfactory results in the juar and cotton tracts. Reports on the experimental stations have been submitted separately.

9. The buildings are now complete: the courtyard requires metalling, and the roads are not yet in perfect order, but this work is in progress. The embankments and drains mentioned in the last report have been constructed, and the whole area is now protected against erosion.

Akola.

The experimental cultivation at this farm was started only two years ago, and it is still too early for many of the series to give definite results: in neither of the years has the rainfall been favourable for this tract. Tillage experiments have been of little value, except to demonstrate that tillage does cause land to absorb and retain all the rain that falls on it: in the year under report the highly tilled lands on this farm became waterlogged. The selection of the cotton has been continued: the object of Series C is to ascertain the relative values of the outturn per acre of the varieties, and in the year under report the newly imported *buri* cotton gave far the best results: but the results do not fairly represent the profits from the local varieties of jari, malvensis and vera, for plants of these varieties suffered severely from the heavy rainfall, and under average conditions it will probably be found that next to *buri* malvensis is the most profitable crop. Samples of all these cottons have been valued by K. B. Bezonji Dadabhoy, and from his report it is clear that *buri* cotton is worth 50 per cent more than the average jari. A further reference to these cottons will be found under the heading of Seed Farms.

Another experiment of general interest is the method of conserving cattle urine: if it be granted that a cultivator in some tracts is obliged to use cattle dung for fuel, this method of conservation doubles his supply of manure. On the farm the night-soil from Akola Town is all pitted and converted into poudrette: at first no satisfactory method had been devised for covering in these pits in the rains, for the earth covering at once sank into the pit, and the area was infested with flies. This nuisance has how been stopped by using a thin layer of cotton stalks, juar cobs and similar farm refuse to prevent the earth from sinking.

The chief juars of the Province have all been tried on this farm. Other crops grown on small areas are groundnut and sugarcane, to supply seed locally. The experiments in cultivating Berar fodder grasses are instructive.

10. Acquisition of the Jora Tank has not completely solved the irrigation question: this tank is filled by a "tar" on the Sokra nala, and Mr. Harriott has pointed out that the nala is not reliable, and he has recommended the construction of another supply tank possessing an adequate catchment area. If the Labhandih Farm were the only land concerned, it is doubtful whether further expense on the water-supply would be justifiable: but the scheme of the new tank has another object, that of increasing largely the irrigable area in the neighbouring malguzari villages; for this reason its construction is most desirable; if water is available for the majority of holdings in the immediate vicinity of the farm, it may reasonably be expected that all tenants in that area will copy the Labhandih methods of cultivation more readily.

Labhandih.

The season was generally favourable. The monsoon ceased in September, and the late rices on the non-experimental area suffered from failure of the water-supply: but the rabi and cane crops gave good results owing to the installation of chain pumps on the nala. In the experimental area, the series that deal with transplantation are perhaps of most interest. Even when late varieties of rice are grown, and the water-supply is only just sufficient to prevent plants from withering, transplantation is found to give increased profit. In the manurial experiments, the best results have been given as before by bulky organic manures: this point is of importance in areas where rice is grown on light soils that are deficient in humus. The wild lucerne mentioned in the last annual report will possibly be of great use in solving the fodder problem: it did well both in Nagpur and Balaghat, and in the current year arrangements are being made to demonstrate its use in the irrigated tracts of Chhattisgarh. Another minor experiment started at the end of the year is growing lac on the tur plants generally planted along the sides of sugarcane plots: this tur remains on the ground for two years. The trees inoculated at the close of the year are at the present time promising fair profit.

Chain pumps for the Nagpur depôt are manufactured at this farm. During the year 62 were sold. It is convenient to make this particular implement at Labhandih, for the demand is best in Chhattisgarh, and freight is saved.

Financially this farm has made a great advance during the year: the income is now nearly Rs. 13,000 against under Rs. 4,000 in the preceding year. The expenditure during the year was Rs. 13,500. These satisfactory results are no doubt due to the intimate connection between the demonstration centres and the farm, and the Superintendent, Mr. Tundilal Powar, deserves great credit for his work during the year.

Powarkhera.

11. A small area of the farm has been embanked to prevent erosion. This bunded area of high class soil will be of use for ascertaining whether early broadcast rice can be successfully grown as a catch crop in the average soils of the district. More buildings for farm ploughmen are required, and will be built in the current year. A question has also arisen as to the advisability of erecting a serai on or near the farm for the convenience of malguzars from other districts who visit it to watch such operations as selection of seed.

The rainfall was too continuous and heavy to permit of proper interculture of kharif crops. The work, however, on this farm is chiefly in rabi crops, and by superior tillage a fair outturn of wheat was assured: the harvest was distinctly above the average crop of neighbouring villages.

The experimental series are still too young to give definite results. In green-soiling it is found that postponement of this operation till September gives a poor crop, owing to the manure not rotting. Tillage experiments were, as above noted, successful: but in this also the results will no doubt be more marked in a season when the rainfall is better distributed. The selection of wheat seed has been continued: but no information about rust is yet available, for even excessive watering failed to produce any on the farm. Mr. Evans was, however, able to collect some useful information about the effect of rainfall on the character of the produce and it appears certain that even with fixed types of seed the amount of moisture received by the crop has a direct influence on the value of the produce in the market. If this is correct the provision of seed which will produce a "strong" wheat every year without fail, may be an impossibility.

The implement depôt at the farm has been well patronized. Showers in April and May greatly stimulated the use of the winnower. A new reaping machine made specially for use in the Punjab was tried on the farm: it is not quite satisfactory, for the short straw of the crop in these Provinces breaks too easily. One of these machines is, however, most useful for reaping the grass on the farm.

Nagpur.

12. This station suffered most of all from the unfavourable character of the monsoon. Generally speaking it was an exceptionally poor year for the kharif crops, with the sole exception of early juar, in the Nagpur country. The experimental area gave little result of practical value, while for general utility the farm is handicapped by the fact that the best land is devoted to experiment and the growth of special crops, for the use of students, while the larger areas that are intended for use as a seed farm are still in poor order: some years of careful, but possibly unremunerative, cultivation must elapse before the land is fit for this purpose. A few fields of cotton, notably buri, gave good outturns: and for exhibition purposes a large number of special crops were grown on small areas, or forced to early maturity. Jute was grown on a small area successfully; but care must be taken to prevent this crop from being waterlogged in the early stages of its growth. The common rabi crops have been grown after jute with success. Selected cottons are being grown on this farm: and during the year a fair amount of seed was distributed.

13. At this farm also jute was successful. On one small plot a light rice was grown subsequently, followed still later by gram. Selected rices were grown during the year for purposes of classification and two fodder crops, Egyptian clover and wild lucerne, gave an excellent yield after the rice. Either of these can be grown successfully in rice land that is at all retentive of moisture: the wild lucerne is probably the better variety for demonstration on account of the ease with which seed can be obtained: if allowed to seed itself, it seems clear that the seed lies dormant during the rains and germinates only at the beginning of the cold weather.

Telinkheri.

PART IV.—DEMONSTRATION.

14. The demonstration programme is rapidly growing. This is perhaps the most important form of work undertaken, for it brings home to the actual cultivator improvements of which the utility has been proved on the Government farms. The scheme must of necessity appear ambitious; for its aim is the education of the tenant on his own land or threshing floor. Demonstration in rice transplantation was started in Chhattisgarh 3 years ago by Mr. Clouston: in the first season a few tenants were induced with difficulty to allow assistants to transplant a few acres only: last year the area exceeded 1,000 acres: at the end of the year under report arrangements were made to transplant 3,500 acres in Raipur, Drug and Bilaspur, from 10 centres, embracing nearly 100 villages: the difficulty now is finding workers to supply the demand The working unit in the scheme, as organized by Mr. Clouston and carried out by Mr. Tundilal Powar, is the village: a trained ploughman or "Kamdar" is lent to the village, and under his direction work proceeds in the fields of as many individual tenants as require help and instruction; an enthusiastic farm servant from Labhandih occasionally induces a number of tenants to try this method in at least a portion of their holdings. A group of about 10 villages forms a "centre" under an Agricultural Assistant and the work of the centres is visited and supervised by the Farm Superintendent. Experimental cuttings were made after last harvest in 17 villages, in the transplanted areas and also in "biasi" fields adjoining, for purpose of comparison: the figures do not claim perfect accuracy, but it may be safely stated that on the average we can put Rs. 25 per acre in the tenant's pocket as additional net profits resulting from transplanting. At the same time it must be admitted that the farm staff finds difficulties occasionally: there are still a few persons who preach that the ultimate object of Government is the summary enhancement of rents in a transplanted area. Besides trained help, the farm occasionally supplies seed free, and spare buffaloes are sent to each centre in order to ensure that the work never stops when once started, but the cultivators provide labour, and usually the seed and plough-cattle. It is occasionally necessary to demonstrate for more than one year in the same village: this may retard completion of the work, but it has its advantages; for it usually results in irrigation of wheat, or the introduction of special crops such as groundnut or good sugarcane. A great part of the area thus transplanted is irrigated from Government tanks: but nearly all the centres included malguzari tanks also. The best results are obtained in irrigated areas; and in Chhattisgarh there are many private tanks which are not used for this purpose: at Thelka, for example, in the Kolar Circle of Raipur, the village tank would irrigate almost the whole village if it were properly equipped with sluices, and if the malguzar could be induced to sell water.

Demonstrations in wheat irrigation were conducted at 7 centres last season, and the average increase in the outturn was shown to be about 400 lbs. per acre.

This valuable work is handicapped by the small number of assistants available. But arrangements have been made for increasing the number of "Kamdars": and it may be possible to increase the size of the centres next season. One or two Agricultural Assistants have not been a success at this work: the demonstrating assistant must live in his centre as best he can, and get about the country in June and July: he has poor quarters, and probably s castefellows near at hand. The Mahratta Brahmin finds this work

in Chhattisgarh most uncongenial. But on the whole the staff have done well and deserve great praise for their work: their methods have already resulted in imitation by tenants who have not been actually taught, and all the spare seedlings at the Labhandih Farm are now purchased by tenants of the neighbouring villages.

In the Northern Circle the work is less advanced for at the outset demonstration should be confined to methods that give large additional profits, and it is inadvisable to frame a programme until the improvement is certain, and the ideas of the tenants have been obtained. The small demonstration farm at Damoh was closed in March: it was too far from the Powarkhera Farm to be supervised properly, and the assistant in charge of it was getting only poor results except in green soiling: he was, however, useful for distributing selected seed and demonstrating the use of implements. In Saugor, Hoshangabad and Narsinghpur, the cultivation of kharif crops in lines was demonstrated in plots belonging to tenants: excessive rain and frost militated against success in several cases. The most important demonstration work in this circle was that of implements: assistants were sent on tour with machinery for saving labour and the work of these men was largely responsible for an exceedingly brisk sale of winnowers in the wheat tracts of the circle in March, April and May.

All the chief fairs in both circles are now visited by assistants, demonstrating the use of implements, and exhibiting selected seeds: at many of these fairs small shows have been started by District Councils, and the lectures of the Agricultural Assistant are attended by large numbers of cultivators. These small shows are a distinct success: but they will deteriorate in utility if they are run on a larger and more imposing scale: for at these large religious gatherings the department has a chance of meeting the small tenants as well as the larger malguzars, and unless the proceedings are of the simplest character the smaller men are inclined to think that they have no place in the "Darbar."

An account of the demonstration work done during the year would be incomplete without some reference to the Nagpur Exhibition. The Agricultural Section was an excellent demonstration not only of the work of the department, in all its branches, but also of the results that can be obtained by cultivators. In the portions devoted to expert work the exhibits of insect pests, with the Entomological Assistant explaining their life history, of soil, manure and cattlefood analyses, and of the influence of various manures on the growth of important crops, were perhaps of most interest to the advanced cultivators: the merchant obtained useful information from the complete collection of the varieties of crops grown in the Provinces: and all classes, rich and poor, were attracted to the exhibit of simple and cheap labour-saving machinery, in actual work. The Hadi plant, turning out high class sugar from cane grown in Raipur and Nagpur, was watched with great interest: and difficulty was experienced in dissuading several cane-growers from ordering sets of this machinery on the spot. The policy of the Department is to try machinery and methods, and recommend only such improvements as are proved to be financially sound. In the current year the Hadi plant will be tried as a working concern, in the cane-growing tracts of Chanda District. Other machines that attracted attention and were ordered by tenants were winnowers, chain pumps with or without bullock gears, and sugarcane presses. Produce exhibited by cultivators included foreign sugarcane, wheat grown under irrigation, as well as numerous varieties of cotton and the staple food crops.

This section of the exhibition was organized by Mr. Clouston and the Nagpur expert staff: its success was due to the zeal with which all officers assisted in the work, for it entailed additional work at Raipur, Hoshangabad and Akola, as well as in Nagpur: the Nagpur Farm undertook the working of the machinery. It is most creditable to find that all this additional work at an important time of year did not seriously affect the working of the farms.

Seed farms.

15. Eight seed farms were under the supervision of Mr. Clouston during the year. No account has been received from the two farms in Wardha District: for in the one case the malguzar kept all the seed for his own villages, and in the other the Court of Wards pre-

fered to dispose of its own produce. The quantity of seed in lbs. supplied by the remaining six farms to the Department is given below :—

Farm.	Buri.	Jari.	Bani.	Total.
	Lbs.	Lbs.	Lbs.	Lbs.
Saoner	3,025	14,524	...	17,549
Akot	494	6,203	...	6,697
Risod	1,574	...	2,800	4,374
Morsi	462	2,471	...	2,933
Chikhli	369	1,080	...	1,449
Yeotmal	11,200	784	...	11,984
Total ...	17,124	25,062	2,800	44,986

In order to guarantee profits, the Department purchased seed at the rate of Rs. 50 per khandi. It was sold to cultivators at the rate of Rs. 30, except in the Feudatory States, where only Rs. 15 was charged in order to induce tenants to grow a better variety. The price paid for ordinary seed in the bazar was Rs. 20 : tenants gladly pay the higher price for the selected seed. Now that the demand for good seed has been proved, no financial assistance will be given to these farms in the current year : the growers will dispose of their own stocks to customers : for seed bought by this Department the price obtained from tenants will be paid. But in order to ensure that seed-growers actually gin their own cotton and get a fair price for the lint it may be necessary for them to sell the latter through this Department : in the year under report the buri lint from these farms was sold to the Empress Mills, Nagpur, at a price 50 per cent higher than that obtained for jari. At the end of the year 8,245 lbs. of buri seed had been distributed in Berar, 1,714 lbs. in the Central Provinces and 1,050 lbs. in the Feudatory States. This variety in the year under report more than fulfilled its promise of the previous year : it gave a larger outturn than did the jari in a year of heavy rainfall, the lowest outturn on the farms being 300 lbs. per acre and the highest 1,080 lbs : it successfully resisted wilt, and the percentage of lint to seed was higher than that of any of the other longstapled varieties, and as high as that of average jari. Possibly buri may not pay so well as jari in years of short rainfall : that is not really material if it gives 50 per cent more net profit in an average year : and since the year under report closed I have seen the growing crop at Rajnandgaon and Raipur, and at the present time (end of August) a good crop is almost assured at those places.

To ensure proper cultivation of this desirable variety Agricultural Assistants who are in charge of the seed farms in Berar have been deputed to supervise in addition the cultivation of buri by tenants in the villages adjoining. Plant-breeding and plant-to-plant selection is proceeding on the Nagpur and Akola Farms and selected seed only will be supplied to the seed farms.

In the Northern Circle Mr. Evans has made similar arrangements on a small scale for the distribution of selected wheat seed. In the case of wheat the comparatively high seed-rate per acre makes it more necessary to multiply the centres from which good seed is obtainable : but it will not be necessary to guarantee substantial financial results to the grower, for the majority of tenants know that the price of wheat depends on the uniformity of the sample and the owners of a seed farm can get 10 per cent additional profit from propagating selected seed whether he sells it in bulk to a dealer, or as seed to other growers.

PART V.—SCIENTIFIC ENQUIRIES AND RESEARCH.

16. During the year 30 samples of manure and water were analysed for the experimental farms : samples were also received from the Jubbulpore Municipality and the Public Works Department. In conjunction with the Principal of the Agricultural College Mr. Plymen

Agricultural Chemist.

investigated the water content of the Nagpur soils. Analyses of wheat were continued during the year to supply material for a note which will shortly be published by Mr. Evans.

Mr. Plymen visited the Lonar lake in October and collected samples of the saline deposits found there. These were analysed and a note on their value submitted to the Local Administration and the Indian Trade Journal. These salts with a short note on them, were also on view in the Nagpur Exhibition. In December Mr. Plymen visited Benares and Lucknow and analysed the effluents of the Sewage works, with a view to collecting data for the consideration of a similar scheme for Nagpur city. Later in the year he made two tours in the sugar-growing districts, Chanda and Raipur: in Chanda the local varieties of cane were analysed, and at Labhandih parent canes were selected for seed after analysis. The local canes in Chanda were found to be distinctly poor, and an attempt will be made to introduce a better class of cane into that district.

Economic Botanist.

17. Good progress was made in the botanical section during the year. In addition to the juars, rices, sannhemp and cotton under observation in the preceding year, varieties of capsicum and *bajra* were examined. Juar suffered from excessive rain, but out of the 100 varieties tried 40 have been selected for growth on $\frac{1}{20}$th of an acre plots: at the end of the year 30 new specimens were received for trial. Over 400 differently named species of rice are under similar observation: while samples of sannhemp have been obtained from nine districts. Samples of seed are seldom pure, and it is generally necessary to select the types in the first year.

For the herbarium the collection of the common farm weeds has been continued. About 500 specimens (including mycological specimens) were collected and identified during the year. A collection of 1,200 named specimens, kindly sent by the Economic Botanist, Bombay, has been of great use in determining the local flora.

Mycological work was confined to the collection of specimens, duplicates being sent to Pusa for identification.

The botanical garden between the Victoria Technical Institute and the College Hostel has been fenced in, and 33 beds laid out. In addition to his ordinary work, Mr. Graham was in charge of the Maharajbagh and Telinkheri gardens for six weeks.

Owing to lack of skilled assistants to carry on the work at Nagpur Mr. Graham was unable to make prolonged tours: he twice visited the Akola and Raipur Farms, and at Hoshangabad made a botanical analysis of the permanent pasture experiments. In August Mr. Graham inspected the site of the Drug public garden, and drew up plans for that garden.

Staff.

At the close of the year the Assistant Botanist returned from Pusa, and Mr. Gregory was appointed to the staff as fieldman.

Accommodation.

The work in this branch is sadly hampered by want of accommodation, and several lines of investigation must be left untouched until the new laboratories are ready.

Entomological Assistant.

18. The practical work in entomology comprised prevention of the fly nuisance in the poudrette pits at Akola, treatment of seed potatoes with crude oil emulsion in the potato-growing tracts of the northern districts, and an attempt to teach the cultivators in Ramtek some method of destroying swarming caterpillars. In addition to the pests under observation last year a caterpillar on the jute crop was studied, and the Pachmarhi peachfly identified. Mr. Ratiram prepared 43 most instructive cases of pests for the Exhibition, and daily gave informal lectures on their life history and the best methods for destroying them, including propagation of predaceous bugs.

In March the assistant was sent to Pusa to consider the programme for the year and to learn the habits of the eri silk moth. Large numbers of eri caterpillars were bred by him in Nagpur, and at the end of May I found it necessary to stop this work, for it was evident that at present we have neither staff nor accommodation to take up this industry on the scale that it demands. It is an entirely new industry different to tassar for the eri caterpillar is reared under cover and the silk is not spun with the machinery used for tassar. It is very doubtful whether any castes can be induced to take up an entirely new line of work; and it is equally doubtful whether new cottage industries are required at a time when agricultural labour is scarce.

PART VI—MUSEUMS.

Nagpur Museum.

19. The Assistant Archæologist, Mr. Basant Ram, re-arranged the arms, metal and porcelain, and other exhibits in the Art Section, but was unfortunately compelled to take sick leave before the work was completed. Temporary arrangements have been made for an Assistant from the Calcutta Museum to put the Industrial Section in order. The Taxidermist obtained a number of specimens while on tour with Mr. Martin, Forest Divisional Officer, and myself in Chanda District, and the collection of water birds is now fairly representative. It would be an advantage if a high class Taxidermist could be engaged temporarily to touch up the specimens preserved and mounted by the local man. Principal additions to the museum during the year were a number of coins and clay models, the latter being obtained from the Nagpur Exhibition.

Attendance.

The total number of visitors during the year was 193,866, the daily average being 520 against 339 in the preceding year: the increase is due to the additional attraction of an Exhibition in Nagpur. Turnstiles have been obtained, and the numbers can be reported with some accuracy.

Financial.

The opening balance was Rs. 92-3-4 and the Government donation for the year was Rs. 2,700. The closing balance was Rs. 420-13-5: under the head of Salary there was a saving during the year, but the expenditure for grain compensation exceeded the allotment.

Raipur Museum.

20. During the year this museum received more attention than usual, over Rs. 600 being spent on new exhibits. It is financed by local bodies. The attendance is said to be improving. The small weaving school attached to this museum has trained 28 persons in the use of the fly-shuttle, and the Secretary reports that some of them are believed to have made use of their training. The competition at the exhibition produced only one loom which may be of use for a cottage industry: the majority were too large, and could only be introduced with success into a community possessing some means of obtaining the yarn on the rollers from the mills.

Victoria Technical Institute Museum.

21. Previous reports have made no mention of the museum in the Victoria Technical Institute. The Principal, Agricultural College, is in charge of this museum and library, and during the year the collection of economical products has been largely increased, and arranged in good order by Mr. Allan. The arrangement cannot be fully completed until certain rooms now used as offices are made available for further exhibits.

PART VII.—GENERAL.

Cattle-breeding Farms.

22. The statements of these two farms have, as before, been included in the report of the Civil Veterinary Department. During the year there was no outbreak of disease, at either farm. The Telinkheri herd has outgrown its pasture. During the year 36

animals were cast and auctioned, and at the close of the year others were weeded out by the Superintendent, Civil Veterinary Department, and will shortly be sold: there were 5 deaths and 28 births during the year. Five bulls only were issued; but the conditions have been amended, and at the end of the current rains a larger number of young bulls will be sold for stud purposes. It may be noted that the cast cows were bought up eagerly by malguzars who desire to start similar herds.

The Powerkhera herd of Malvis is now in a more satisfactory condition. The old bull has been sold, and four new cows purchased. The herd now contains 59 animals, there having been 2 deaths and 13 births during the year. No young bulls were issued during the year, the majority of the young stock having been condemned in the preceding year. The want of this herd is a really high class bull: efforts to procure one in Malwa have so far been unsuccessful; yet it is clear that such bulls do exist because the offspring of cows purchased in calf in that locality occasionally show exceptionally good breeding.

It is however doubtful whether this scheme for providing Government bulls will ever meet with complete success, particularly in the Southern and Eastern Divisions: in the northern and western parts the Malvi type is of general utility, but in other tracts it seems advisable to pay more attention to improvement of purely local breeds, however poor those breeds may now appear. This improvement can seldom be attained by importing a bull of a totally different stamp: he is unsuitable for the cows, and frequently not of the right conformation for the cultivation of the tract to which he is imported, and moreover he is less immune to the local diseases than are bulls born and bred in that locality. For these reasons a small experiment is to be tried in Raipur District, where the fodder reserves are available as an exercising ground: a few of the local stock are to be purchased in the nearest villages, and an attempt made to improve that stock by careful feeding. Major Baldrey, Superintendent, Civil Veterinary Department, is in charge of this scheme: and if it proves successful, it may be possible to institute similar exemplar farms in other tracts.

Distribution of Implements from Government Depôts.

23. The demonstration of implements at the Nagpur Exhibition, as well as in the field and at smaller agricultural shows resulted in a brisk sale of implements, both at Nagpur and at the new Powarkhera Depôt. A table of these sales is appended:—

Names of Implements.	Number supplied to			
	District and other Government officers.	Private persons.	Demonstration and other Experimental Farms.	Total.
Turnwrest plough	1	36	3	40
Fodder-cutter	...	3	...	3
Paragaon grinder	...	1	...	1
Broadcast-seeder	...	1	...	1
Corn-shellers	18	21	...	39
American winnowers	4	21	...	25
Smalley cutters	...	2	...	2
All-iron winnowers	...	27	...	27
Swedish ploughs	...	4	...	4
Colonist grinder	...	1	...	1
Lever-cutter	...	7	...	7

Names of Implements.	Number supplied to			
	District and other Government officers.	Private persons.	Demonstration and other Experimental Farms.	Total.
Feed-cutters ...	...	1	1	2
Segment-planter ...	...	1	...	1
Bullock gears ...	6	30	1	37
Chain pumps ...	...	63	...	63
Country ploughs ...	...	1	...	1
Bakhars ...	...	14	...	14
Scufflers ...	1	...	1	2
Tiffans ...	...	4	...	4
Dauras ...	...	...	2	2
Dundias ...	...	...	2	2
Dataris ...	...	2	...	2
Total ...	30	240	10	280

24. Fodder-cutters are not in great demand. But there is a brisk market for chain pumps, with or without bullock gears, and for winnowers. A larger number of these implements will be stocked during the current year, in order to prevent disappointment, for several further orders remain to be executed, and any demonstration is now followed by a demand for machinery. From an informal discussion that took place at the Board of Agriculture it seems possible that the object of these depôts may be understood. The object is simply to advertise implements of which the utility has been proved on the farms, and to sound the demand: it is not intended that the Department should take up shop-keeping on a large, or even a small, scale, and we shall be grateful to a private firm that will take over from the Department the business that is rapidly being established. But it should at the same time be remembered that it will remain necessary for some years to test machinery departmentally, and recommend only what is proved to be both cheap and labour-saving: for local manufactures on a large scale are practically non-existent, and the foreign manufacturer has not the local knowledge of each district and tract which is indispensable at the present state of the trade. It is trusted that private persons or firms may be induced to take up this question in the near future: for the stocking and sale of implements entails a great deal of trouble on officers who have equally important and more legitimate duties to fulfil in the field.

Engines.

25. Of the two engines installed at the farms, the small steam engine at Akola has worked successfully; but the oil engine and pump at Telinkheri is not so economical as the mote. These oil engines may pay in other parts of India: but it is doubtful whether they can be installed with advantage in these Provinces until trained workers are more easily obtained.

Distribution of seeds.

26. The cotton seed farms have been already mentioned. The demand for other seeds has now been established, and when the selected seeds have been grown as field crops it may safely be predicted that all the seed available will be readily bought by tenants, who desire to grow a crop that will certainly sell well. Except in rare cases where a new variety is introduced into a backward tract, the farm seeds are sold at a price considerably higher than that prevailing in the bazar. Farm seed of proved merit and fertility is more valuable than ordinary grain, and experience has proved that cheap sales make purchasers undervalue seed that they buy. If a man pays highly for his seed, he may be trusted not to let it rot or feed it to his cattle.

Agricultural Associations.

The work of these Associations is making good progress. When they were first started, there was a tendency for members to consider them as small district darbars, reserved only for influential men who might be, but were generally not, practical farmers. That idea is rapidly disappearing, and many of these associations now contain a large majority of members who are not only dependent upon agriculture but are keen to assist in any schemes for improvement that may be brought to their notice. Their work will continue to improve as the Deputy Directors get into touch with every tract in their charges, and meet individuals whose opinions may be helpful. Individual members of several associations are now able to produce figures and prove that adoption of methods or seeds recommended has in their own case added considerably to the profits of their holdings. Such men are becoming of great use to the Department in both circles: for in addition to advertising improvements they can bring to the notice of Deputy Directors or Farm Superintendents local wants and conditions which the latter have had no opportunity of observing.

Tassar cultivation.

28. The Agricultural Assistant at Arsoda worked well during the year, and in spite of disease occurring about 6,000 seed cocoons, of 4 varieties, were made available for distribution. Their cultivation is still in the experimental stage: it has many difficulties, of disease and other enemies, to meet; and it is still uncertain whether the castes that are interested in this industry will themselves assist in the revival. At the present time any labourer can obtain ample wages from a tenant or malguzar, and there is naturally but a small inclination to continue a work that is relatively less remunerative now than it used to be, and which is moreover only carried out at some discomfort to the worker.

Action taken on the recommendation of the Board of Agriculture.

29. The Board of Agriculture in February 1908 made but few criticisms on the work proceeding in these Provinces. It was resolved that in Mycology and Entomology the practical field work should be undertaken by the ordinary staff of Agricultural Assistants: and with this object the expert staff in these branches has been limited to the specialists for college work, the staff subordinate to the specialist being fieldmen only. The recommendations of the Board about improvement of the pay and prospect of Provincial Departments are still under consideration. The breeding of poultry was discussed by the Board and in carrying out the resolution passed a small stock of imported poultry is now being raised.

In the year under report the Board met at Nagpur in February. It was attended by all members of the staff, either as members and visitors; and accommodation was provided at Telinkheri in a camp pitched for the purpose, the summerhouse in the garden being used for meetings of the Board.

Co-operation with Irrigation Department.

The Demonstration work in Chhattisgarh is arranged in consultation with the Irrigation Department. As the staff expands it will be possible to extend this work in districts where large Government works have been constructed: but for some time the progress must of necessity be slow.

Notice of services.

30. The close intimacy in Chhattisgarh between the Department and the actual cultivator needs no proof over and above the figures of the year's demonstration programme. This satisfactory result is due entirely to the sympathetic manner in which Mr. Clouston has dealt with all classes of cultivators, as well as to the admirable method in which he has organized the work, throughout his circle. Mr. Tundilal Powar continues to be a most able Superintendent: and his axiom that he and his assistants must be able to live in any village with tenants of any caste or creed as his friends is a guarantee of still further success. The same spirit of intimacy is equally marked in the Northren Circle, where Mr. Evans has now a wide circle of friends among the malguzars of all his districts: and when the full staff of the circle is available Mr. Evans will be ready to proceed with a fuller demonstration programme.

Messrs. Plymen, Graham and Allan are still unable to move about the country as freely as they would like: but during the year they have done valuable work in their respective spheres in addition to the extra work that the Exhibition entailed upon them.

Of subordinate officials, all worked well except two assistants who disliked transplantation in Chhattisgarh. Messrs. Nundkishore and Bhayalal, at Powarkhera and Akola, have their farms in good order: it is to be regretted that all these Farm Superintendents have not more opportunity for touring. In the year under report the Exhibition tied several of them to their farms for some time: and the Overseers are still too inexperienced to be left in charge for long.

In addition of officials already mentioned, I must express my thanks to Mr. H. L. Menasse, my Office Superintendent and in fact the whole office for the ready assistance that was given in connection with the Exhibition and the entertainment of the Board of Agriculture.

P. HEMINGWAY,

Director of Agriculture,

Central Provinces.

Govt. Press, Nagpur—No. 1343—D. of A.—30-9-09—530.

DEPARTMENT OF AGRICULTURE

OF THE

CENTRAL PROVINCES

FOR THE YEAR

1909-10

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No. 452
XIII-18-9.

CENTRAL PROVINCES ADMINISTRATION.

Agriculture Department.

Nagpur, the 14th November 1910.

READ—

Report on the Department of Agriculture, Central Provinces, for the year ending the 30th June 1910.

RESOLUTION.

The work of the Department continues to grow at a quicker rate than its establishment: promising fields of work have to be left practically untouched for lack of a sufficient superior staff, both European and Indian, and the scanty proportions of the subordinate establishment limit demonstration to comparatively small areas. The conflict between the aspirations of an enthusiastic Department and the limitations imposed by lack of qualified agents is liable to result, unless carefully watched, in an attempt to undertake too much, with the inevitable accompaniment of a decline in the high standard of efficiency now attained. The Chief Commissioner desires to invite the particular attention of the Director to the need for caution in extending the work of the Department until the staff is strengthened. This must take time, and depends, so far as the subordinate establishment is concerned, on the outturn of the Agricultural College at Nagpur and the extent to which the passed students enter the Department. At present few are of sufficient calibre to warrant the expectation that, with the present organization of the Department, men fit to take charge of more exacting posts than Superintendent of Farms will be available in sufficient numbers. The Chief Commissioner has lately addressed the Government of India on the whole subject of establishment for the Department, and hopes that before long it may be equipped on a scale commensurate with the importance of the interests it is intended to foster.

Meantime, the utility of the small staff of Agricultural Assistants available for demonstration is much extended by the employment of intelligent farm-labourers, trained on the Government Farms in particular operations as demonstration agents under the close supervision of the Assistants.

2. The College still lacks complete laboratory accommodation, and during the year under report the arrangements for instruction in entomology and agricultural engineering were inadequate. The laboratories are, however, now under construction, and since the close of the year proper provision has been made for teaching the two subjects named.

The number of passed students turned out yearly is steadily increasing; the fall in the number admitted in the year under report was due partly to fortuitous causes, and partly to disgust excited by the connection of the College with the defacement of the statue of Queen Victoria. In the current year the numbers have risen again, and the College is better filled than it has ever been. The tone of this institution is now all that it should be: the Principal has been careful to make the course thoroughly practical, and has been ably assisted by the staff.

The malguzari class fared worse than ever before, and it has been decided to substitute, for the mixed course of theory and practice extending over a whole year, short courses of purely practical instruction in particular operations at the Akola, Powarkhera and Labandih farms. Such courses have already been initiated at the Labandih farm, and it has been found that they attract the practical farmer, who is in a position to put in practice what he learns. Instruction on the lines of that offered in the malguzari class might perhaps have its uses in other circumstances, but until the prestige of the Department is more thoroughly established, it is perhaps too much to expect that an institution of the sort should have any appreciable effect on the agricultural practice of the country.

The *Agricultural Gazette* deservedly continues to extend its circulation—the subjects of the articles, which, with rare exceptions, are contributed by the staff of the Department, are well chosen and clearly dealt with in simple language.

3. No new lines of experiment were started during the year: but further progress was made in several important items. *Buri* cotton has more than maintained its reputation as the best of the longer stapled cottons grown in these Provinces: Messrs. Tata's expert valuers consider that it is improving under the process of selection to which it is subjected at Akola, and that if it does not deteriorate during the next 3 or 4 years, it will be deserving of extensive trial. Under the methods now followed, by which a good strain of seed is distributed from the seed farm area of the experiment station at Akola to the private seed farms, the produce of the latter being sold to cultivators, there is every prospect that the quality of this cotton and its productive power will be not only maintained but improved, and if dealers will pay a price which will make the cultivation of this variety at least as profitable as that of *jari*, a large increase in the production may be expected. But it appears that even at the valuation placed on the crops by Khan Bahadur Bezonji Dadabhoy Mehta (Manager of the Empress Mills) and by Messrs. Tata's valuers, who allow full weight to the superior staple, *buri* does not give quite such a large return as a good crop of *jari* or *kathivilayati*. It is possible, however, that owing to the special suitability of *buri* for heavy land and its freedom from wilt, this price would be sufficient to encourage the extension of *buri* cultivation, but it is essential that the cultivator should be able to make sure of a fair price. At present, by special arrangement, all the long stapled cotton produced is collected by the Department and sold to the Empress Mills at Nagpur at the Manager's valuation, but if there are to be hundreds of thousands of acres under the crop where there are now thousands, buyers in the open market must be ready to differentiate between the long and the short stapled variety. Some valuations made for Mr. Clouston by firms in the trade indicate that the commercial grading is determined rather with reference to colour and cleanliness than to the staple. The nomenclature employed by the trade supports this inference, based as it is mainly on the names of the stations at which the cotton takes the rail. So long as quality varies with locality, this method of identification serves its purpose, but if *buri* becomes of commercial importance, it will probably be grown in all parts of Berar and the Central Provinces, ousting the *jari* from the heavier lands and perhaps encroaching on the lighter soils also where wilt is persistent; the coarsest and shortest stapled cotton in India will then be loaded at the same siding as one of the best, and some amplification of the classification will become necessary. The stage of development in the cultivation of *buri* (and perhaps of the malvensis type of *jari*) at which this revision of the trade arrangements will become necessary, if discouragement of the crops is to be avoided, must depend to some extent on the efficiency of the special arrangements now made by the Department for the collection and sale of the produce; but the sooner dealers in the open market begin actively to encourage the cultivation of this crop by making such arrangements as will ensure that the cultivator gets a price which will pay him, the more rapidly will the cultivation of the crop extend. This matter appears to the Chief Commissioner to be one which should merit the attention of the Chambers of Commerce, for the inclusion of many varieties of cotton, good and bad, under a single trade category deriving its name from the locality, real or supposed, from which the cotton comes cannot fail to

prejudice the market that the growers of really superior cotton might find if the variety they supplied obtained for itself the special recognition of a trade classification.

Perhaps the most promising work at Akola, after that connected with cotton varieties, is the series of manurial experiments in cotton. The combination of a nitrogenous fertilizer with farm-yard manure appears likely to be of great value as a manure for cotton, and has already attracted the attention of some of the more enterprizing farmers.

4. In the Northern Circle, Mr. Evans has been doing useful work in connection with wheats, and has inaugurated a system of private seed farms for the distribution of pure and selected strains of wheat which have already proved their value in the market. The experiments at the Hoshangabad farm have not yet been conducted long enough to warrant the formation of a final opinion on the subjects with which they deal, but results up to date appear to indicate that unirrigated rabi cultivation stands at a great disadvantage as compared with cotton and rice. The crop responds much less to the application of manure; indeed, the figures afford reason to doubt whether the increase in yield would pay for the cost of applying the manure in any but the best and flattest land. The problem of the application of water to the land therefore assumes an added importance, and the Chief Commissioner trusts that the Director of Agriculture will see that particular attention is paid to it at the Hoshangabad farm.

5. At the Labandih farm in the rice country, the investigation of the possibilities of ground-nut in that part of the Provinces, both as a sole crop and when followed by wheat with irrigation, has shown the value of the crop to Chhattisgarh. Experiment at this farm has established the great value of bone-dust as a manure for rice: as many of the cultivators of that part are Satnami Chamars, and there is a large slaughtering establishment in the centre of the tract, the introduction of this improvement on a large scale in the agriculture of Chhattisgarh appears to depend only on the erection of a disintegrating plant capable of producing bone-dust at a reasonable cost.

6. A most important feature of the work of the experiment stations during the year was the great increase in the receipts. At Hoshangabad the takings increased by 50 per cent, and at Akola and Labandih they were so large as to pay not only for working expenses but also for the salaries and allowances of all the staff employed in connection with the demonstration work of the Circle and to leave in the case of Akola a handsome balance of several thousands of rupees besides. Mr. Craddock is far from suggesting that the value of the produce is the most important criterion of the efficiency of an experiment station pure and simple; but if experiment stations are to be in the best position to influence cultivation, they must be provided with facilities for testing new or improved varieties, or new methods of cultivation, on a large scale, and for the production of large quantities of seed for distribution to the public, through the medium of private seed farms or by direct sale to other cultivators. Every experiment station should therefore also be managed in conjunction with a large farm, and if that farm can be maintained at a substantial profit, it forms a valuable advertisement of the wares offered by the Department and thereby increases its prestige—and not only this: if experiment stations with such farms attached can be made, without loss but rather with a gain, in efficiency, to pay their own expenses and that of all the demonstration staff attached to them, the further development of experiments and demonstration must be enormously facilitated. The Chief Commissioner doubts whether in the rabi country the natural conditions will ever permit of profits large enough to cover all the expenditure connected with an experiment station and the demonstrations attached to it; but he sees no reason why, where cotton, rice and sugarcane are important crops, the experiment stations, with due economy in building and working, should not always be paying concerns, covering all their own expenses, including interest on capital outlay, *plus* the pay of the demonstration staff attached.

7. Extensive demonstration operations continued in the Chhattisgarh Division on the same lines as heretofore, with the addition of a new item—double

cropping with ground-nut and wheat under irrigation. The Director of Agriculture should enquire carefully into the causes of the unsatisfactory results of the attempt to break new ground in the Bilaspur District. In his report on the Raipur experiment station, the Deputy Director complains that the Superintendent of the farm, who also supervises demonstration, has far too much to do, and it may be that to attempt to break new ground in Bilaspur was trying the staff too high. The report gives no indication of the extent to which the past efforts of the Department to introduce the transplantation of rice under irrigation have been successful; it would be interesting to know whether the practice of transplantation was continued after the demonstrators had been withdrawn, and if not, why not. Double cropping with ground-nuts and wheat is an innovation which should prove of great value in irrigable black-soil lands, and should be largely taken up when the Tandula and Mahanadi canals are completed.

In the cotton and wheat tracts demonstration operations are on a much smaller scale, and are concerned chiefly with the supervision of cultivation on private seed farms and the use of implements. Mr. Evans did valuable work in teaching a method of preventing the attacks of the potato-moth, which, having been introduced with Italian seed-potatoes, has caused much loss in the last few years.

8. The produce of the cotton seed farms was for the first time sold without the intervention of the Department; the result was most satisfactory, disclosing a strong demand for the seed at high prices. It does not seem worth while to continue to devote one seed farm to *bani*, for which there is now no demand. The cotton seed sold from the 22 private farms and from the Government farm at Akola was sufficient to sow about 10,000 acres. The Department should now aim at increasing the area of the private seed farms until it suffices to absorb all the seed produced on the non-experimental area of the farm. At a very conservative estimate the 125 acres available for cotton on the Akola farm should, through the medium of seed farms, supply seed sufficient to sow 30,000 to 40,000 acres. A good commencement has been made with a similar system in the wheat country.

9. The Agricultural Chemist and Economic Botanist are employed principally in lecturing at the College, but both of them have found time for some research work in collaboration with the Deputy Director. The Chief Commissioner hopes that Mr. Graham will make further efforts to find a market for the Nagpur oranges. The Ramtek irrigation tank has brought a cheap water-supply within reach of large areas of suitable land, and the supply of oranges could be indefinitely increased if a demand at a good price were forthcoming.

10. It is too early yet to determine whether the object with which the two Government cattle farms are maintained will be more certainly achieved by selling than by lending the bulls produced. The system of lending was certainly not successful, and purchasers will no doubt take greater care of the animals than malguzars frequently did under the old system. But there is the danger that purchased bulls may be castrated and used for draught purposes. The Director of Agriculture should take steps to satisfy himself on this point. The Chief Commissioner will watch with interest the results of the attempts toi mprove Chhattisgarh cattle by amelioration of the conditions in which they are kept.

11. The demand for implements of European design increases slowly. A good reaper adapted to local requirements would probably find a market in the Nerbudda valley. The Chief Commissioner had hoped that ere this some of the retail sellers of hardware in the mofussil would have taken up the sale of implements and spare parts: but little or nothing appears to have been accomplished in this direction.

12. The Agricultural Associations in several districts are now showing a very active interest in the improvement of agriculture and are an invaluable link between the Department and the farmer.

13. The Director of Agriculture should report fully as to the result of the tassar-rearing experiment: the Chief Commissioner is not satisfied from the brief reference to the subject in the Report that the objects of the experiment have been fully understood. Although it may have proved impossible to keep the worms free of disease, other useful lessons may have been learnt.

14. Under the administration of Mr. Hemingway, the Department has preserved and developed further those relations with cultivators essential to the transition from experiment, through demonstration, to practice—and has certainly strengthened its position in the Provinces. Both the Deputy Directors are now well known in agricultural circles in their charges; their superior knowledge is recognized and their qualities appreciated. The College staff are to be congratulated on lifting that institution out of the unsavoury mire into which it had fallen in the preceding year.

ORDER.—Ordered, that a copy of this Resolution, together with the enclosure, be submitted to the Government of India in the Revenue and Agriculture Department; and that copies be forwarded to the Director of Agriculture and to all Commissioners and Deputy Commissioners, Central Provinces, for information and guidance, and that it be published in the Supplement to the *Central Provinces Gazette*.

B. P. STANDEN,

Chief Secretary to the Chief Commissioner,

Central Provinces.

Govt. Press, Nagpur:—No. 1647, Civil Sectt.—17-11-10—530.

Report on the working of the Department of Agriculture, Central Provinces, for the year 1909-10.

PART I.—ADMINISTRATION.

Controlling staff.

1. During the year under report there was no change in the controlling staff. Three officers, Messrs. Clouston, Plymen and Graham, were absent on privilege leave for short periods: but it was not necessary to obtain substitutes to fill the temporary vacancies; their work was undertaken by other members of the staff.

Subordinate staff.

2. Six new assistants joined the staff. Of this number one only is an addition to the College staff, to replace the professor in Agriculture who will shortly retire: the remaining five men have been attached to the farms for experimental and demonstration work. At the end of the year proposals were formulated for removing from the cadre all assistants who are connected solely with the College, either as lecturers or assistants to the expert staff. But the cadre still remains in a somewhat unsatisfactory state, some of the higher posts empty, and others filled by College workers, while the lower grades are more than filled by the field staff now being recruited. This matter will right itself gradually, as the field assistants prove their worth, and obtain promotion. No men are now on Foreign Service: none can be spared.

Financial.

3. The Budget allotment for expenditure during the year was Rs. 3,78,439. Savings to the extent of Rs. 18,395 were allowed to lapse at the end of the year: half of this was under the head of Director's salary. The savings could have been spent: but under the orders of the Local Administration economy was practised wherever possible, and several small schemes for improvement were deferred till a more favourable season.

PART II.—AGRICULTURAL EDUCATION.

4. The Nagpur College still suffers from poor laboratory accommodation: work is however in progress, but it will probably take two years or more to complete the buildings. The number of students admitted during the year was slightly below the number admissible: for in order to reserve room for residents of these Provinces who apply late, applications from outside were refused, and in the end the vacancies reserved were not all filled. In last year's report note was made of the scarcity of local students. This is a disadvantage that cannot be removed within a year: proposals now under consideration, for the conferring of regular agricultural degrees, for admitting holders of such degrees to various departments, and finally for enlisting on adequate pay more men of sound merit in the Agriculture Department itself, will in time attract more candidates: at the same time demonstration work, coupled with efficient management of Government farms will gradually prove to the farming classes that an educated farmer will make substantial profits where the man with less education will simply struggle to make both ends meet. Before very long we shall have candidates for admission in abundance: meanwhile no object would be served by making the standard of admission less strict. The proposal to accept students who have failed to matriculate is not a backward step: for an entrance examination will be held which cannot be passed by non-matriculates unless they are at least up to matriculation standard in general knowledge and ability, as well as in the particular subjects that a course of scientific training demands.

In the final examinations in March, 47 students presented themselves, of which 15 were in the 1st year, 22 in the 2nd and 10 in the 3rd. The results

were on the whole good: in the 3rd year only one student failed while two obtained the 1st class diploma. The students of the 1st year are a somewhat uneven lot, and on the whole not brilliant: there can be no doubt that the College suffered in that year from the trouble in the Maharaj Bagh, and parents suspected that boys might be led astray. But that period is now passed, and recruiting in the future will not be prejudiced by the suspicion that the College may have some connection with political intrigues. Examination results were particularly good in practical agriculture: for this the Principal, Mr. Allan, deserves personal credit. Success in the practical work is a proof that the weeding out of applicants for admission is fulfilling its object. Even if a student fails to obtain a diploma at the end of his 3rd year, he has the consolation of knowing that so long as he has passed in agriculture, his training has not been wasted altogether: he can take some definite experience back to his own land; he may possibly become a good farm manager in private service. He may not be qualified for Government service, but he has a better equipment for earning a living than has the man whose training comes from books only.

The discipline of the College is good. The Hostel rules are strict, but not irksome. Arrangements have been made for all students to dine in the Hostel, and games are practically compulsory.

At the end of the year proposals were submitted for remodelling the Nagpur Farm, as an educational College farm entirely. Other farms are now available for experimental work; and Mr. Allan desires to replace experimental with demonstrational areas, and also to give students more land on which individuals may carry out work selected by themselves, from a wide range of approved subjects. Another educational detail that should be added is a small dairy farm.

Malguzari class.

5. The malguzari class did not fill well during the year. It started with 10 boys, but only four remained till the end of the course. Plague may have caused boys to leave: but even that would not have taken them away altogether if their heart had been in their work. The few who remained through the year were good workers: and the malguzari master is not to be blamed for the small numbers. But it is now a question whether this class should be continued under its present name; and during the year proposals were sent up for starting short classes of instruction in particular crops both at Nagpur and Raipur, these classes will not be limited to the sons of malguzars; elder men, including private kamdars, will also be instructed. If this experiment is successful, it may be further extended to other farms, suitable but cheap accommodation being provided. A most promising start has been made in Raipur, where the class has filled well, though no scholarships are given: in fact Mr. Allan refers in his report to this point as proving the futility of scholarships in the malguzari class; and there is good reason to believe that boys have come in on such scholarships merely to earn their keep for a few months, and perhaps apply later for a post as patwari. This matter was referred to in the last report: possibly the ensuing year will see the end of the malguzari class, or rather its abolition in favour of a scheme which has a wider scope.

Publications.

6. The *Agricultural Gazette* is rapidly becoming a popular paper. The circulation is now 5,680 over 1,000 better than last year. It is now supplied to nearly all schools; and is purposely written in the simplest possible language in order that it may be understood by tenants and boys who have the minimum of education. It is a matter of some difficulty to obtain a supply of material of a simple variety, teaching science without the use of scientific terms: but the members of the staff have kept the periodical going successfully, and two articles were supplied during the year by non-officials. In the future this Gazette will be of great use for publishing the names of seed-growers, with the amounts of selected seed available, throughout the Provinces: it has dealt with cotton and juar farms during the year.

One bulletin was published by Mr. Evans on the annual variations in the character of Central Provinces wheats.

PART III.—AGRICULTURAL ENQUIRY AND RESEARCH.

Experimental stations.

7. The year under report was distinctly favourable. The actual monsoon was perhaps too heavy at times for cotton and juar: but still it was a year of normal outturns, with bumper returns in the case of some particular crops. The cold weather showers were true to their name, and gave both good and general rain during Xmas week.

Akola.

8. A shower or two of rain in October instead of in December would have given ideal conditions: but even without such conditions the crops on this farm were exceptionally good, though the cotton was not free from blight and the heavy winter rains spoilt cotton that was ready for picking: but there was no actual loss; for the plants continued to flower and fruit till May, and a second crop of juar appeared which gave a considerable quantity of fodder. The use of poudrette was slightly limited by a difficulty in getting men to handle it: and all attempts to induce neighbouring tenants to use it failed for the same reason.

The experimental series of most general interest deals with the comparative outturns and values of the principal cottons. K. B. Bezonji Dadabhoy has taken great interest in this work, and both advises and buys the better stapled varieties at a fair price. It is clear that in years of short rainfall the better classes of cotton will be ousted by the hardier and more prolific types: but at the same time the better varieties can be grown with more profit in the wetter land, where the ordinary country jari fails: and "buri" is moreover wilt resistant. It is clearly impossible to evolve a single variety which will suit every field equally in every year: but Mr. Clouston's work at Akola over a short series of years shows that the cotton-grower can increase his profits substantially by growing his varieties pure, and in land that is suitable for each variety. In each variety also there is a good increase in the profits from plant selection; the coarser varieties are selected for outturn only; but length and strength of staple, as well as outturn and percentage of lint are given prominence in the varieties that will spin the higher counts.

Financially, this farm was most successful. The actual receipts were Rs. 13,700, exceeding the expenditure by Rs. 1,470: but the actual value of the produce, including a large surplus stock of karbi, was nearly Rs 19,000; this more than covers the pay of the whole staff attached to the farm, though all the assistants, except one overseer, spend practically the whole of their time on demonstration work and cannot therefore be considered members of the farm staff. Part of the surplus karbi has been stacked in the open, to test whether it deteriorates during the rains to any great extent. If that experiment is successful it should be possible for tenants to form reserve stocks in years when karbi is cheap and plentiful.

Labandih.

9. A small Hostel was built at Labandih during the year to accommodate persons who come to the farm for a short course of instruction in rice or cane growing. It is an unpretentious cheap building of the same character as the other accommodation provided. Seven young men have already joined these classes. Fifteen kamdars on the temporary demonstration staff were trained during the year, as well as several mission boys.

The irrigation experiments both in rice and wheat, must be read in conjunction with the rainfall: average results for a series of years will be published later, when sufficient figures are available. The figures of the year indicate that the average wheat land of this tract rarely requires more than two waterings to give the maximum crop. In the case of rice the figures of the year amply corroborate the results previously gained of the enormous additional profits accruing from transplantation and irrigation. In the manurial series a light dressing of bone dust, 20 lbs. of nitrogen per acre, gave most remarkable results: the rice was transplanted, but unirrigated: the additional profit per acre resulting from the manure was Rs. 34. There is a distinct opening for a bone-crushing factory in

this tract: the Chhattisgarh Chamar tenant could no doubt be easily induced to use the manure freely. Bulky organic manures, cattle-dung, poudrette and night soil all gave excellent figures: but the supply of these manures is limited in a tract where fuel is scarce and few large towns exist.

The experiment of inoculating the plants with lac was a failure. A small plot of land is devoted to garden crops and good fruit trees, in the hope that the Chhattisgarhi who comes to a short course may realize that with irrigation he can grow crops of all varieties. The land adjoining this farm has been taken up in tenant right by a well known malguzar of the district, with the intention of copying Government methods of cultivation.

The farm is financially very sound. Including miscellaneous receipts the income was over Rs. 12,500: the expenditure of Rs. 14,000 includes all the demonstration staff, and also a sum of Rs. 1,100 for the purchase of an adjoining plot of land. The income obtained of this small area should afford some food for reflection to the Chhattisgarh tenant: every man may not have irrigation; but any man who grows wheat can crop his wheat land in the rains with ground-nut, ensuring thereby a heavier outturn of wheat: such cultivation was most profitable at Labandih during the year.

Powarkhera.

10. Quarters for a blacksmith and carpenter, and an isolation shed for sick cattle, were added to the buildings during the year. The land at the lower end of the farm, on the slope, is not yet in good order: the banks to prevent erosion are working well, but the silting up process must be gradual, and till it is complete much of this land is not really profitable. A small area on the level land has been embanked for double-cropping: but the early monsoon was too capricious on this farm for the bunds to fill well.

The green soiling experiments, without irrigation, will now be discontinued. They have proved that the crop must be ploughed in not later than the second week in August: and by that time the growth may be but small. If the land is irrigated the ploughing may be delayed, and the results more satisfactory. Other experiments of general interest were, to a certain extent, vitiated by white ants or similar troubles: but one deep ploughing at the end of the hot weather, if a man can afford it, has been proved of great benefit to the wheat: while in another series the "tifan" has been used with great success to reduce the seed rate of wheat substantially.

Most interesting results were obtained from the irrigation experiments with wheat. The heavy winter rains gave from normal to bumper rabi crops without irrigation: yet an increase of nearly 500 lbs. of wheat resulted from two light waterings in November and early December. It will take some years to prove whether the heavy soils of this tract will stand annual irrigation without deterioration. The rust experiments proved nothing, for no rust appeared.

The receipts of the farm went up by nearly Rs. 2,000 during the year, and totalled Rs. 6,000: this is a satisfactory figure for a cropped area of 240 acres, of which a large portion is below the standard. The total expenditure was Rs. 10,000: but as at Labandih and Akola, this includes the pay of demonstration assistants: their travelling allowance alone cost Rs. 1,225. The working of the farm, including the pay of the regular farm servants, cost altogether Rs. 5,000.

Nagpur.

11. The rainfall in Nagpur was not quite so favourable as it was elsewhere, but the season was distinctly better than its predecessor. The land on the Lendra side is gradually being brought into order, but it is still very poor: the nala was bridged during the year, and the road will be completed, to render this portion of the farm more easily accessible during the rains.

This farm is now in a period of transition: it is being laid out afresh for educational purposes, other farms being now available for experimental work.

Larger areas are now set aside for the exclusive use of the College students, and experiments that are not of an educational character are being discontinued. The winter rains did some damage to produce that was not under cover ; but on the other hand the cotton gave in some fields additional pickings of 120 lbs. per acre at a time when in ordinary years the plants are withered. Wheat gave a heavy outturn ; and a trial crop of oats was most successful ; the 5 inches of rain gave moreover a plentiful supply of fodder.

One of the experiments carried out during the year will be of value if jute is ever grown extensively under the irrigation works in the Province : a light dressing of an active fertilizer, nitrate of soda, in combination with a small amount of farm yard manure, gave an increase of 550 lbs. of fibre to the acre.

Financially this farm can never hope to be a success : it must always have a big bill for variable labour ; for some years it requires money for improvement of roads and land ; and the best land is devoted to instruction. During the year the income from produce was Rs. 7,550, but the income was raised to Rs. 5 370 by sale of a few implements, and miscellaneous items, including rent of land leased out to the Kachhis. The total expenditure was nearly Rs. 14,000 : but this includes over Rs. 2,100 spent on cattle, roads and buildings, and nearly Rs. 4,000 on members of the superior staff, who act largely as demonstrators to the College.

Telinkheri.

12. Practically the whole of this small area is now devoted to the propagation of selected strains, and the trial of new varieties obtained from the Economic Botanist. Wild lucerne and Egyptian clover have been grown as fodder for sale in Nagpur, and small areas were under cane and jute : cane-seed was supplied during the year to the demonstration centres at Ramtek and Sindewahi. The selected strains of cotton did well during the year and some were supplied to the seed-farms to be grown on a larger area.

General.

13. It is interesting to note that in addition to officials of this Department a large number of unofficial visitors now inspect the farms : some record of such visits is maintained, and it is known that over 4,000 tenants and malguzars came without prompting to see the work now being done.

I may be permitted to indicate here the necessity of increasing the number of these farms, as soon as funds become available. We can now deal with the problems of the Chhattisgarh rice tract, the cotton and juar tract of Nagpur and Berar, and the wheat-growing Nerbudda valley. But on the existing farms it is impossible to deal fully with questions relating to the Wainganga rice tract and the Jubbulpore country : in the near future two additional farms will be required, possibly in the Chanda and Jubbulpore districts, and preferably in the area commanded by the larger irrigation works.

PART IV.—DEMONSTRATION.

14. In Chhattisgarh the programme forecasted in the last annual report was carried out fully. In that division the work of transplanting rice, irrigating wheat, and introducing cane and ground-nut was completed on about 4,000 acres. In Bilaspur the work was not so successful as it was elsewhere ; new ground was being broken, and passive resistance, with occasional adverse criticism, resulted in but small total areas. Figures were collected of the outturn in 36 villages of the Raipur and Drug districts and compared with the outturn from *biasi* on the adjoining land : the figures may not be quite reliable ; and it should be remembered that the transplanted rice was generally a later and heavy variety. But over the whole area in these 36 villages the increase was 687 lbs. per acre, that is, over 50 per cent. Ground-nut was introduced successfully as a crop before wheat. Cane cultivation will spread but slowly ; it requires capital, and rates of interest are high in this tract. The wheat irrigation was not of great importance during the year : long breaks at the end of the monsoon caused a great demand of water for rice, and by the time that wheat was sown several of the tanks were empty : heavy rain at Xmas also discouraged further

watering. Demonstration was also started in the Nagpur district under the Ramtek tank, and near Sindewahi in Chanda: in the latter circle high class canes are being introduced, and the demonstration plots serve the purpose of seed-farms also. The work is still greatly handicapped by the scarcity of assistants: it is of a trying character, for the assistant in charge of a circle must be perpetually on the move during the rains, and his head-quarters is some remote village with no social amenities, and but the poorest accommodation. The temporary staff of kamdars, trained on the farm, will enable the work to extend: but progress cannot be hurried, and the 4,000 acres covered this year in one circle is a distinctly good record.

The large irrigation works now under construction will completely alter the cultivation over extensive areas, and to meet the demand for instruction that will gradually arise it is now necessary to strengthen the staff as rapidly as possible, in all branches, if men of the right type become available.

In this same circle the seed-farms for cotton and juar have increased in number: they are now found in 22 villages spread over Berar and the Nagpur country. Originally they supplied cotton only; but select juar has since been added in all. They are self-supporting; but the cultivation is closely supervised by an assistant; and they are moreover connected with demonstration most closely, for the assistants in charge also supervise and practically direct the cultivation in a large number of villages near the farms wherever the selected seed has been sown by purchasers. Of this area we have no definite record in actual figures: but judging from the amounts of selected seed sown it is probable that tenants on over 5,000 acres received the help of the staff: that represents but a small portion of the area for which seed was actually sold. The pickling of juar-seed, and use of artificial manures are also taught extensively on these seed-farms.

In the northern circle the demonstration work is on a smaller scale, and of a different character: it is however like that of Berar in that it is closely connected with private seed-farms. In the wheat tract a number of these farms were working during the year, the land being selected and cultivation completed with the advice of the agricultural assistants. Kharif cultivation in lines was again demonstrated, and an assistant spent some months in the Saugor district teaching deep ploughing for the eradication of *kans*. Three small plots have been taken up in Jubbulpore, Damoh and Khandwa districts: but at present the work on this land must be regarded as experimental.

In the northern potato-growing districts large quantities of seed were treated with crude oil emulsion.

Fairs have been attended for the purpose of demonstrating implements or delivering lectures, as in previous years. Work under this head has increased rapidly, and it is becoming necessary for Deputy Directors of Agriculture occassionally to decline assistance at such fairs: the distances between these shows are great, the dates of the principal days cannot be fixed with regard to the convenience of the Deputy Director of Agriculture or the Farm Superintendent and the staff that can be trusted to demonstrate effectively to a large audience is numerically small. When a choice lies between two fairs held on the same day, or within a short interval, preference is given to that at which the officers of the Department have on previous occasions met large numbers of actual cultivators: the tenant with a small or mediumsized holding is the man to be attracted at a religious fair; his wealthier brother, or the malguzar, is in touch with the Department through the District Agricultural Association.

Seed-farms.

15. Mention has been made in the preceding paragraph of these private seed-farms: they are rapidly increasing in number in both circles, and are all self-supporting. To give them a start in the northern circle, the Department guaranteed a selling rate 10 per cent higher than the market rate of ordinary produce, that being the additional value placed on our own produce by the agents of Messrs. Ralli Brothers. It was, however, unnecessary to arrange any sales: the growers kept all their seed for private distribution. *Buri* cotton gave a heavy outturn during the year near Burhanpur;

and in order to keep the seed pure, arrangements were made to gin the seed for the growers. In the case of the wheat-farms the increased yield from the selected seed was most noticeable: this had not been guaranteed; purity and soundness were the only qualities claimed; though the germinating power was above the average since the seed is stored with great care. No record is available of the actual quantity of seed stored on these farms and private holdings, for sale in the current season. The seed depôt at Powarkhera Farm distributed over 21,000 lbs. of selected wheat-seed largely deshi-pissi: other seeds in demand there were, "malida" gram, ground-nuts, and *jari* cotton.

In the southern circle where the seed-farms are older, the quantity now distributed is more substantial and the rate of increase will shortly afford certain proof that the Department can make and is making material improvement in the total outturn of the Provinces. The total quantity of selected cotton-seed supplied to growers in this circle during the year was 123,500 lbs.; of this 43,000 lbs. came direct from the Government farms, principally Akola; the remainder was supplied by private farms. There can be no doubt that this select seed is actually sown: the price paid for it is generally between Rs. 34 and Rs. 40 per khandi of 640 lbs., while bazar seed during the year could be bought for half that price, and seldom fetches more than Rs. 20. In fact growers report even higher prices, for small consignments of seed: the Nachangaon Farm in Wardha got as much as Rs. 71 per khandi for a small quantity. No tenant will pay these prices for seed as food for his cattle. Another point of importance is that of the total amount sold 42,500 lbs. was seed of *buri* cotton: separate figures for malvensis are not available, but the area under that variety is extending gradually as the seed is supplied from Akola and Nagpur in larger quantities. The demand for "bani" seed is not brisk: but *buri* is on the whole the better cotton, since it gives a better percentage of lint and is wilt resistant.

Only 9,242 lbs. of seed remained unsold at the end of the season, with the growers: the owners of the older farms, for example, R. B. Raghoba Ratiram of Saoner, could not meet the demand fully. These farms have been so successful that no difficulty has been met in getting their owners to grow selected juar on the same terms. In order to keep the strains pure fresh selected seed is supplied annually from the Akola and Telinkheri Farms to the private growers, and the cultivation is supervised by assistants of the Department.

During the year similar plots belonging to private persons were put under select sugar-cane near Sindewahi in the Chanda district, under the supervision of a resident agricultural assistant.

For rice the Labandih Farm is at present the only agency, and the amount sent out is not large, about 2,000 lbs. only; but this was all selected seed, principally gurmatia. This farm sent out over 11,000 lbs. of ground-nut to private growers during the year, as well as large quantities of sugar-cane seed.

Seed distribution, from both Government and private farms, has certainly been facilitated by the higher prices charged for that seed. If an article is offered cheap or free the tenant either suspects its merits, or may even forget to sow it. The policy of asking a good price for a superior article is certainly giving most satisfactory results, to all parties.

PART V.—SCIENTIFIC ENQUIRIES AND RESEARCH.

Agricultural Chemist.

16. Mr. Plymen made no extended tours during the year. He has started collecting material for a hand-book on the soils of the Province, and is investigating the physical composition of soils that are said to be specially suitable or unsuitable for embanking. During the year he dealt with about 70 samples submitted to him for examination; the analyses of most importance were of different samples of ground-nut grown at Labandih, and various well waters that are reported unsuitable for irrigation purposes. The ground-nut analyses may be of great importance; for if this crop becomes popular as a soil renovator, and covers large areas, its value as an oil-seed also will be considered by the local markets. The analyses of well waters has revealed the presence of alkaline salts, which account for what has been con-

sidered a mere local prejudice against certain wells. This is a matter which may interest the Irrigation Department, though the risk of deterioration is obviously smaller in the case of irrigation from large works than it is in the small patch watered by one particular well.

Economic Botanist.

17. Mr. Graham continued the work on the crops mentioned in the last annual report; and in addition grew a number of cucurbitas under observation. Over 500 varieties of rice have been dealt with; and 15, including six varieties of fragrant rice, have been handed over to Mr. Clouston: four early varieties were also sent to Hoshangabad for trial. Six promising fodder juars were made over to Mr. Allan for comparison on $\frac{1}{20}$th acre plots. The various capsicums were priced in the local bazar, and the best have been selected for experiment and propagation on a larger scale.

The herbasium work has made great progress. The total number of sheets is now 1,468. The collection of local weeds will shortly be completed, and a convenient list published for purposes of identification by the field staff and College students.

In addition to his usual work Mr. Graham despatched an experimental consignment of Nagpur oranges to Covent garden. It was found that an exporter would at the present time be confronted with several difficulties: firstly, cold storage is necessary, and that is not readily available; secondly, the Nagpur orange loses its flavour by being packed when unripe; thirdly, the time of year when it would sell well is early October, and by that time the fruit is hardly ready for packing. To these must be added a brisk demand in the local market, for home consumption.

Entomological Assistant.

18. Mr. Ratiram has continued his study of the local pests: the cotton suffered severely from bollworm, and later in the year the maghai tilli in Hoshangabad was attacked by a beetle which was a stranger to the tenants The bag method of destruction was demonstrated repeatedly in various districts, and large quantities of seed potatoes were saved by the application of crude oil emulsion. Show cases of local pests are under preparation for the farms.

PART VI.—MUSEUMS.

Nagpur Museum.

19. In order to facilitate management the Museum Committee during the year decided to abolish the Public Rooms Fund as a separate fund: it has now been amalgamated with the Museum Fund. A satisfactory arrangement has also been made for the care and upkeep of the building. It requires a separate godown for stores and articles under classification, in order that the verandahs may be cleared and all rooms kept neat and tidy.

The Industrial Section was rearranged by Mr. Vieux, Assistant Curator of the Indian Museum. The Natural History Section only remains to be improved: the old Taxidermist was of little use, and his services have been dispensed with. A better man will be obtained, if possible; but good collectors and mounters are not easily found. The total number of visitors during the year was nearly 25,000.

The Public Rooms were used on 11 occasions. It is a matter of some regret that no other public buildings are available for dramatic and other entertainments; for the central and side rooms could well be devoted to Museum exhibits, in particular from the Industrial Section.

Raipur Museum.

20. The Raipur Museum has now a large balance of nearly Rs. 2,700 in hand, and the Divisional Commissioner has recommended that the Committee should increase their accommodation and extend its industrial work. If the attendance register is correct, the Museum is attracting large numbers of visitors. The weaving school attached to the Museum is doing useful work: 30 persons were trained during the year in the use of the fly-shuttle.

21. Additions are being made to the collection of economic products in charge of Mr. Allan in the Victoria Technical Institute. The library on the ground floor is largely used by students from the Hostel. The accommodation in the Museum proper is defective: but when the new office for the Commissioner of Settlements is completed the rooms now occupied by part of my staff will be available for the display of forest and mineral specimens: shelves and cases have already been fitted up for that purpose.

Victoria Technical Institute Museum.

PART VII.—GENERAL.

22. The bull-breeding farms at Telinkheri and Powarkhera are managed by the Deputy Directors of Agriculture in conjunction with the agricultural farms. Both herds are now in good order. The Telinkheri herd was growing too large; and 15 cows and 21 heifers were cast for sale during the year, realizing an average price of Rs. 30 per head, though they were the worst of the herd, many of the cows being cast for age. The practice of lending bulls has been stopped; 22 bulls were sold at an average price of Rs. 106; the best bulls fetch considerably more, but during the year several old bulls were sold cheap which had been returned by borrowers. The receipts exceeded expenditure by Rs. 500, but the number of animals sold was larger than usual. The farm will pay its way if it turns out about 15 good bulls annually: and the present stock is large enough to secure that object. Actual sale has improved the demand for these bulls, and in subsequent years the prices will certainly rise.

Cattle-breeding farms.

At Powarkhera sales have been limited: the herd is new, and the early calves of the cows first bought had generally been got by indifferent bulls. The young stock now coming on is most promising, and the cows form a most attractive and uniform herd. A few worthless cows, and the rejected bulls, after castration, brought in some income: the few good bulls fetched Rs. 75 each. It will take two or three years more before this herd turns out a steady supply of young bulls, sufficient to cover its expenses.

The improvement scheme in Raipur has been entrusted to Mr. Clouston, Deputy Director of Agriculture. When the matter was considered fully it resolved itself into a question of feeding, and use of existing fodder reserves. A small exemplar farm has been started on the Nawagaon reserve: about a dozen of the local small cattle have been bought, and model sheds erected which would not be too expensive for the average malguzar or large tenant. Mr. Clouston is also experimenting with ensilage, and juar and sann hemp as fodder crops. The real difficulty in Chhattisgarh is that of fodder, plus an extravagant supply of undersized cattle, useless for the plough, but prized because they supply the Chamar tenant with fuel and an occasional meal: all the grass off existing birs goes to the roofs of the houses instead of the stomachs of the cattle. Improvement will accompany, or follow, the advance in agriculture. The bulk of the plough-cattle are buffaloes and will always be imported: they will be imported in even greater numbers when the position of the tenantry improves, under the influence of irrigation works. Meanwhile the Department will direct its efforts towards teaching the use of fodder crops and utilization of existing reserves. It is really a question of village economy, not of breeding: if we could push the supply of bamboos and tiles we should indirectly improve the state of village cattle. More can be done by indirect methods than by starting Government breeding farms on a large scale: facilities for the latter do not exist in Chhattisgarh proper. At the same time we can advise and assist any men who do honestl ydesire to start small breeding herds of their own: such cases must however be exceptional, except in the zamindaris.

23. Implement depôts have been started at Akola and Raipur, in addition to those already in existence. The object of these new depôts is not to increase the sales by Government at the expense of the shop-keeper, but to afford a farm visitor the facility for buying at once what he wants without having to wait till it is supplied, and extra freight charged, from a solitary depôt some hundreds of miles away. Enquiries have recently been received from a few firms that show some interest in this business

Distribution of implements from Government depôts.

and may possibly take it up, relieving the farms of work that is both troublesome and unsuitable. The following list of implements sold in the year under report will interest such enquirers.

Names of Implements.	Number supplied to			
	District and other Government officers.	Private persons.	Demonstration and other Experimental Farms.	Total.
Turnwrest plough	15	104	2	121
Smalley's fodder-cutter	...	6	...	6
Corn-shellers	9	11	1	21
T. W. plough shares	...	4	...	4
American winnowing machines	3	12	1	16
Akola „ „	4	...	...	4
Brass bucket pump ... —	...	1	..	1
All-iron winnowers	...	80	...	80
Iron castings for winnowers	...	1	..	1
Hand-thrasher	...	1	...	1
Hand chaff-cutter	...	1	...	1
Lever-cutters	...	2	...	2
Bullock-gears	6	12	3	21
Chain-pumps	14	31	2	47
Sugarcane mills	...	6	...	6
Cawnpur maize hullers	...	76	...	76
Wire cloth for winnowers	...	7 sets	...	7 sets
Bakhars	1	...	...	1
Scufflers	1	...	...	1
Tifan	3	1	...	4
Country plough	1	...	...	1
Dundias	4	8	...	12
Argarha	1	...	...	1
Dataris	...	...	4	4
Drill plough	1	...	..	1
Belgaum chaff-cutter	...	1	...	1
Perfection sprayer	...	2	...	2
Total ...	63	367	13	443

Chain-pumps, bullock-gears and turnwrest ploughs are still selling well in the Southern Circle: in the Northern there is a brisk demand for winnowers, and several private persons now put these simple machines on the market; a mistry in Hoshangabad turns out a number that will compare favourably with the machines built at Rasulia, or imported from America. Messrs. Clouston and Evans have written articles on the subject of implements for the Director-General of Commercial Intelligence during the year: and arrangements have been made for the use of *takavi* in purchase of implements. Cases have been reported during the year of malguzars purchasing several machines, and hiring them out at reasonable rates to their tenants.

Hadi plant.

24. An installation of the Hadi plant for sugar making was worked at Sindewahi in the Chanda District by skilled men under the supervision of an Assistant lent by the United Provinces Government. The object of the experiment was to discover whether such plant could be worked profitably by the small communities of cane-growers in that tract. A separate report on this experiment is now being prepared: the accounts are not quite complete yet. The Assistant in charge—Mr. Bhupnarain—was an excellent Manager, and his work attracted a great deal of attention among the cane-growers. The experiment was in many ways a distinct success, though it is doubtful whether the profits of the concern will compare favourably with those of an up-to-date gurh-boiling plant. Financially, the extra profits depend on the rate at which the waste gurh can be sold: and unfortunately that gurh was spoilt by rain in transit to Nagpur, and has come on the market as a cattle food: we have, however, been able to pay a fair price for it for use on the farms. But this experiment was of great value in many ways: it afforded an excellent opportunity for demonstrating, on a working scale, the superiority of modern cane mills, in actual competition with the antiquated wooden mills still in use: reliable figures were obtained of the gurh obtained per acre, both by local and improved methods: at the start of the work, the failure to obtain a decent percentage of sugar was in itself most instructive; tenants were insisting on cutting cane before it was ripe, and were losing a third of their sugar thereby. The improved mills in use are now in great demand: and the way has been well prepared for a thorough demonstration of good boiling plant next season.

Agricultural Associations.

25. The Agricultural Associations are developing into regular working organizations in many districts. In both circles individual members were largely responsible for the distribution of selected seed from farms: while both in Berar and Chhattisgarh Mr. Clouston has outlined a programme of work that members can take up to assist the demonstration; in Raipur and Drug several members have co-operated most heartily in pushing transplantation. The interest that certain of these societies take in their work is indicated by a movement in several districts to raise funds for that work by subscription from members. In the Southern Circle divisional meetings on the farms have been arranged for next season: one such meeting took place in the past year at Hoshangabad, and was most successful. These divisional meetings will provide a good opportunity for the presentation of the agricultural "sanad" which is now under preparation; this sanad has been instituted as a suitable means of expressing the thanks of this Department for the assistance that it receives from private gentlemen in furthering the numerous schemes of improvement devised by the Deputy Directors.

Tassar cultivation.

26. Mr. Badri Dutt Joshi worked well during the year under most uncongenial surroundings at Arsoda, near Armori. This nursery has now been worked for over two years, and the experiment has shown that it is impossible to eradicate by means of a seed depôt of this type the disease to which the decay of the local industry has been attributed. Seed from Bilaspur and Chaibassa proved inferior to that obtained locally: but even the local breed deteriorated after the first generation. The failure is easily explained: the female moths do not remain under control, but pair during flight with wild males; so long therefore as wild males have access to the plot—and they cannot be kept out—it will remain impossible to prevent them from introducing the disease afresh. This result has been confirmed by similar results in other Provinces, and it appears inadvisable to continue the work: the cost is small, but the Assistant could give far more valuable assistance to the Department if he returned to general duty.

Poultry.

27. The rearing of imported poultry has proved a failure: the stock was tried both at Hoshangabad and Nagpur without success. The fowl-keeping industry appeals to very few natives in these Provinces: and if any improvement is to be made, the persons interested could probably effect it by selection of local breeds, rather than by trying imported birds which cannot stand the heat and fall an easy prey to the roving jackal.

28. The majority of the members of the staff attended the meeting of the Board at Pusa in February. The Board had few criticisms to offer on the provincial programme.

Board of Agriculture.

29. The demonstration work in both circles has been arranged in consultation with the Irrigation Department: it is impossible at the present time to carry out completely the scheme that the members of that Department would desire: the trouble is that we require more trained men, both Assistants and Kamdars; it is useless enlisting men who do not understand the work, for one failure discredits a large number of successes. But the staff is growing, and even if the work is on a small scale, its start in the Nagpur Division has been successful.

Co-operation with other Departments.

The Irrigation Department has also been consulted about the new experimental series in irrigation that have lately been laid out. At the request of the Financial Commissioner a note was written during the year indicating the assistance that this Department can give in the management of Court of Wards Farms. Such assistance must be largely advice: but in the distribution of selected seed co-operation with District Officers can afford advantage to both parties: the selected seed supplied by Mr. Evans to the Diwan's estate in Seoni must have enhanced the receipts of that farm considerably; while in Wardha District the Nachangaon and Kutki estates will probably, with Mr. Clouston's help, develop their seed farms into a most remunerative business.

30. Both Messrs. Clouston and Evans are to be congratulated on a most successful year: not only are their farms in first class order; but the extension of the demonstration areas, and the appreciation of the seed farms by tenants of all classes, are sufficient proof of the close intimacy between the officers of the Department and the actual cultivators. The Inspector-General of Agriculture visited both circles during the year, and has left it on record that the farms visited were models of good cultivation at the time of his inspection; Akola merited special praise as being one of the best farms, if not the actual best, seen during the year; but Mr. Mollison's approval was not confined to one farm, and, in fact, all deserve praise.

Notice of services.

Of the Superintendents, Mr. Bhayalal at Akola deserves particular mention. Mr. Nandkishore has effected much improvement at Powarkhera: in the past he has been handicapped by the want of good Overseers. Work at Raipur, and throughout the Chhattisgarh Division, has been well managed by Mr. Tundilal Powar, who was made an Extra-Assistant Commissioner during the year.

All the expert staff at head-quarters deserve great credit for their work: the College is still in its infancy, but the expert staff can be trusted to turn out practical men, either to enter Government service or to return to their own farms: the material is not always of the best, but the latest recruits are a distinct credit to their teachers.

As time goes on we shall have fewer failures in the field: the work is known to be exacting, and is particularly uncongenial in the first few years of an Assistant's service; but the field staff has settled down well, and in a short time it will be possible to pick out individuals whose success in demonstration needs special recognition.

My office staff has as before worked well under Mr. Menasse. Some difficulty is experienced in getting good farm clerks: in that respect Raipur has not been fortunate in the past.

P. HEMINGWAY,

Director of Agriculture,

Central Provinces.

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